

570.6

A5

M99

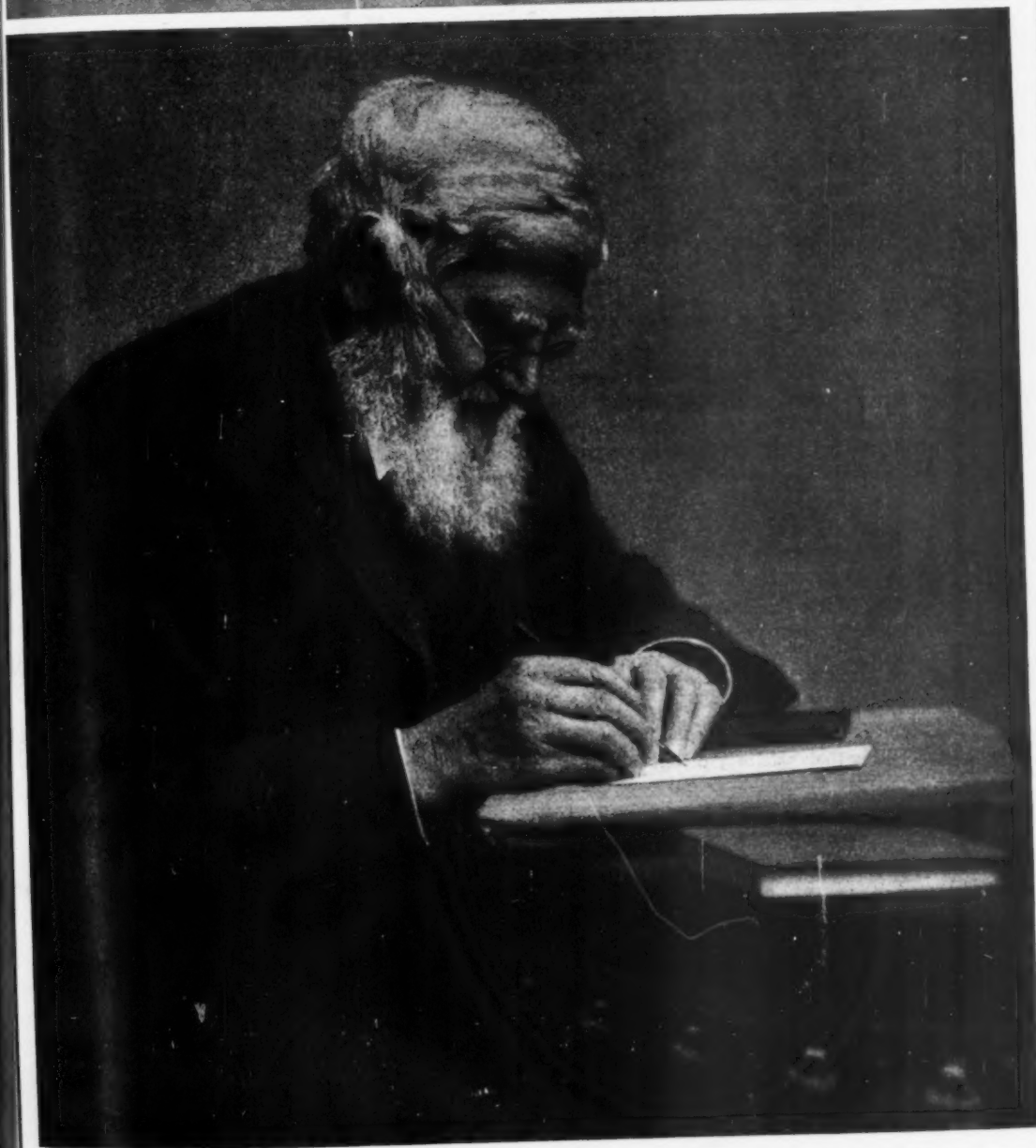
December, 1913

GENERAL LIBRARY

JAN 2 1914

OF MUSE

The American Museum Journal



FREE TO MEMBERS

FIFTEEN CENTS PER COPY

American Museum of Natural History

Seventy-seventh Street and Central Park West, New York City

BOARD OF TRUSTEES

President

HENRY FAIRFIELD OSBORN

First Vice-President

CLEVELAND H. DODGE

Treasurer

CHARLES LANIER

Second Vice-President

J. P. MORGAN.

Secretary

ADRIAN ISELIN, JR.

THE MAYOR OF THE CITY OF NEW YORK

THE COMPTROLLER OF THE CITY OF NEW YORK

THE PRESIDENT OF THE DEPARTMENT OF PARKS

ALBERT S. BICKMORE

GEORGE S. BOWDOIN

FREDERICK F. BREWSTER

JOSEPH H. CHOATE

THOMAS DEWITT CUYLER

JAMES DOUGLAS

MADISON GRANT

ANSON W. HARD

ARTHUR CURTISS JAMES

WALTER B. JAMES

A. D. JUILLIARD

SETH LOW

OGDEN MILLS

PERCY R. PYNE

WILLIAM ROCKEFELLER

JOHN B. TREVOR

FELIX M. WARBURG

GEORGE W. WICKERSHAM

EXECUTIVE OFFICERS

Director

FREDERIC A. LUCAS

Assistant Secretary

GEORGE H. SHERWOOD

Assistant Treasurer

THE UNITED STATES TRUST COMPANY OF NEW YORK

The Museum is open free to the public on every day in the year.

The American Museum of Natural History was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world. The membership fees are,

Annual Members.....	\$ 10	Fellows.....	\$ 500
Sustaining Members (Annual).....	25	Patrons.....	1000
Life Members.....	100	Associate Benefactors.....	10,000
Benefactors (gift or bequest)		\$50,000	

The Museum Library contains more than 60,000 volumes with a good working collection of publications issued by scientific institutions and societies in this country and abroad. The library is open to the public for reference daily — Sundays and holidays excepted — from 9 A. M. to 5 P. M.

The Museum Publications are issued in six series: *Memoirs*, *Bulletin*, *Anthropological Papers*, *American Museum Journal*, *Guide Leaflets* and *Annual Report*. Information concerning their sale may be obtained at the Museum library.

Guides for Study of Exhibits are provided on request by the department of public education. Teachers wishing to bring classes should write or telephone the department for an appointment, specifying the collection to be studied. Lectures to classes may also be arranged for. In all cases the best results are obtained with small groups of children.

Workrooms and Storage Collections may be visited by persons presenting membership tickets. The storage collections are open to all persons desiring to examine specimens for special study. Applications should be made at the information desk.

The Mitla Restaurant in the east basement is reached by the elevator and is open from 12 to 5 on all days except Sundays. Afternoon Tea is served from 2 to 5. The Mitla room is of unusual interest as an exhibition hall being an exact reproduction of temple ruins at Mitla, Mexico.

The American Museum Journal

VOLUME XIII

DECEMBER, 1913

NUMBER 8

CONTENTS

Frontispiece, Portrait of Alfred Russel Wallace, 1823-1913

Half tone by courtesy of *Popular Science Monthly*

A Great Naturalist — Alfred Russel Wallace, 1823-1913

HENRY FAIRFIELD OSBORN 331

South African Fossil Reptiles.....ROBERT BROOM 335

With portrait of Dr. Broom, the world's chief authority on South African Permian reptiles. Article illustrated with photographs of fossil reptiles from Dr. Broom's private collection, showing some ancestors of modern mammals

The Stefánsson Expedition and Other Arctic Explorations

A. W. GREELY 347

To the Maquiritares' Land.....LEO E. MILLER 351

Report by the leader of the Museum's lower Orinoco expedition

Some Kitsan Totem Poles.....GEORGE T. EMMONS 362

An inland Indian race of the extreme northwestern part of British Columbia and their carved heraldic columns not hitherto reported upon

A Record Sunfish.....BASFORD DEAN 370

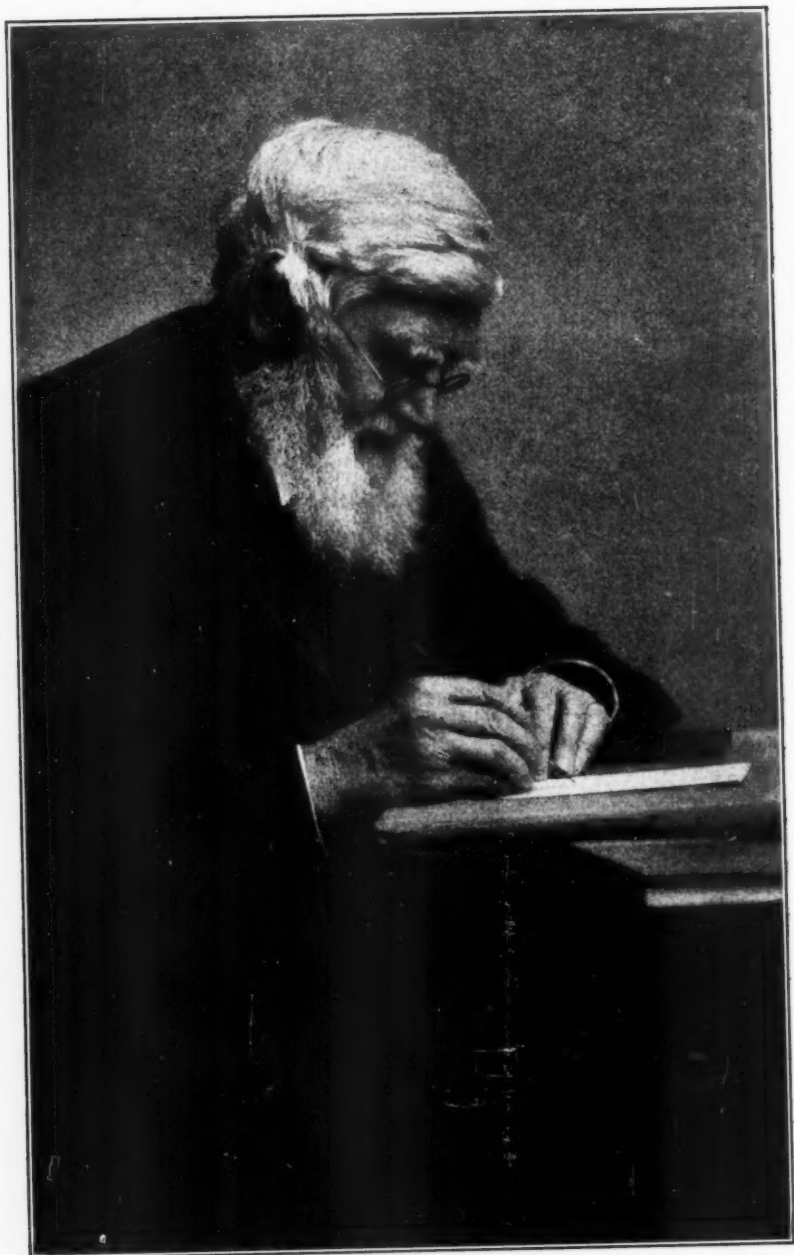
Museum Notes..... 373

MARY CYNTHIA DICKERSON, *Editor*

Published monthly from October to May by the American Museum of Natural History. Terms: one dollar per year, fifteen cents per copy. Entered as second-class matter January 12, 1907, at the Post-Office at Boston, Mass., Act of Congress, July 16, 1894.

Subscriptions should be addressed to the AMERICAN MUSEUM JOURNAL, 77th St. and Central Park West, New York City.

The Journal is sent free to all members of the Museum.



Alfred R. Wallace -

A GREAT NATURALIST ALFRED RUSSEL WALLACE, 1823-1913

By Henry Fairfield Osborn

THE nineteenth century in Great Britain, the Victorian Age, will be compared in history with the greatest intellectual periods in the history of Athens, of Rome and of Florence. Brilliant as were England's achievements in art, literature and the spreading of civilization, her achievements in science outshine them all. No country has ever produced such a constellation of stars of the first magnitude in the same brief period of time, especially in the sciences of geology and biology. The dominant figure of course is that of Darwin, whose influence upon the world of thought is to be compared with that of Aristotle only. Anticipating and surrounding Darwin were members of an unrivaled group of men, beginning with Sir Charles Lyell, a geologist, and including Sir Joseph Hooker, the botanist, Alfred Russel Wallace, the naturalist, and Thomas Henry Huxley, the anatomist and natural philosopher.

Wallace, the last survivor of this remarkable group, died on November 7, 1913, in the ninety-first year of his age and the sixty-fourth year of service and discovery. He followed by only a few months another member of the group, Sir Joseph Hooker, who was present at the Darwin celebration at Cambridge in 1909, the centenary of the birth of Darwin.

Because the fame of Wallace rests chiefly on his codiscovery with Darwin of the theory of natural selection he is sometimes thought of as Darwin's contemporary but he was actually fourteen years younger and made the discovery of natural selection twenty years later than Darwin. He was always the first to recognize Darwin's seniority and leadership. In his remarkable journeys in South America and in the Malay Archipelago, filling the years 1848 to 1862, Wallace was influenced by Darwin's classic work, best known as the *Voyage of the Beagle*.

The simultaneous publication of the law of natural selection independently discovered by these two great naturalists was followed on the part of Wallace by a lifetime of devotion to this chief principle of Darwin's special theories of the causes of evolution. While Huxley was the stalwart defender of the evolution theory and of Darwinism in general without committing himself to either of Darwin's special interpretations of the theory, Wallace devoted himself continuously to the support of Darwin's special hypotheses. Yet almost from the first he differed from Darwin in some very important particulars. He never could bring himself to believe that the mind and spirit of man were the results of the same evolution process as that which had developed his bodily structure and that of all the lower orders of animal

The half tone of Alfred Russel Wallace is used by courtesy of *Popular Science Monthly*

creation. As early as 1864 he advanced the hypothesis that so soon as man learned to use fire and make tools, to grow food, to domesticate animals, to use clothing, and to build habitations, the action of natural selection was diverted from his body to his mind and that thenceforth his bodily form remained comparatively stable while his mental faculties improved.

Five years later Wallace had definitely broken away from Darwin's conceptions with regard to natural selection and developed the opinion that this law is wholly inadequate to account for several of the bodily as well as psychological characteristics of man, such as his soft and sensitive skin, his speech, his color-sense and his mathematical, musical and moral attributes. He drew the inference from this class of phenomena, that a superior intelligence has guided the development of man in definite directions and for special purposes, just as man guides the development of many animal and vegetable forms.

Another striking divergence of the views of Wallace from those of Darwin related to the theory of the origin of the very striking differences which exist between males and females in many divisions of the animal kingdom. Darwin in his theory of sexual selection advanced the idea that the female was attracted by the brilliant and gaudy appearance of the males, as for example among birds, and that throughout the animal kingdom generally, beauty of coloring is especially characteristic of the males, is consciously perceived by females and thus selected. Wallace, on the other hand, sought to explain all the instances of brilliant and gaudy coloring on other principles. Thus in 1868 he propounded an original explanation of the quiet colors of nesting birds, pointing out that when the nest is exposed to view the female is always inconspicuous in coloring or imitative of its surroundings, while the male of the same species may be conspicuously or gaudily colored. Among other varieties of birds where both the sexes are conspicuously colored he noticed that the nest is such as to completely conceal the sitting bird.

Wallace specialized in the interpretation of the coloring of animals. He developed the theory of mimicry, or protective resemblance, the conception of which we owe chiefly to Bates and to Müller. One of his famous observations is that of mimicry in the leaf butterfly, which we find described in his delightful volume of 1869, the *Malay Archipelago*. In his own language his first observation of *Kallima paralekta* was as follows:

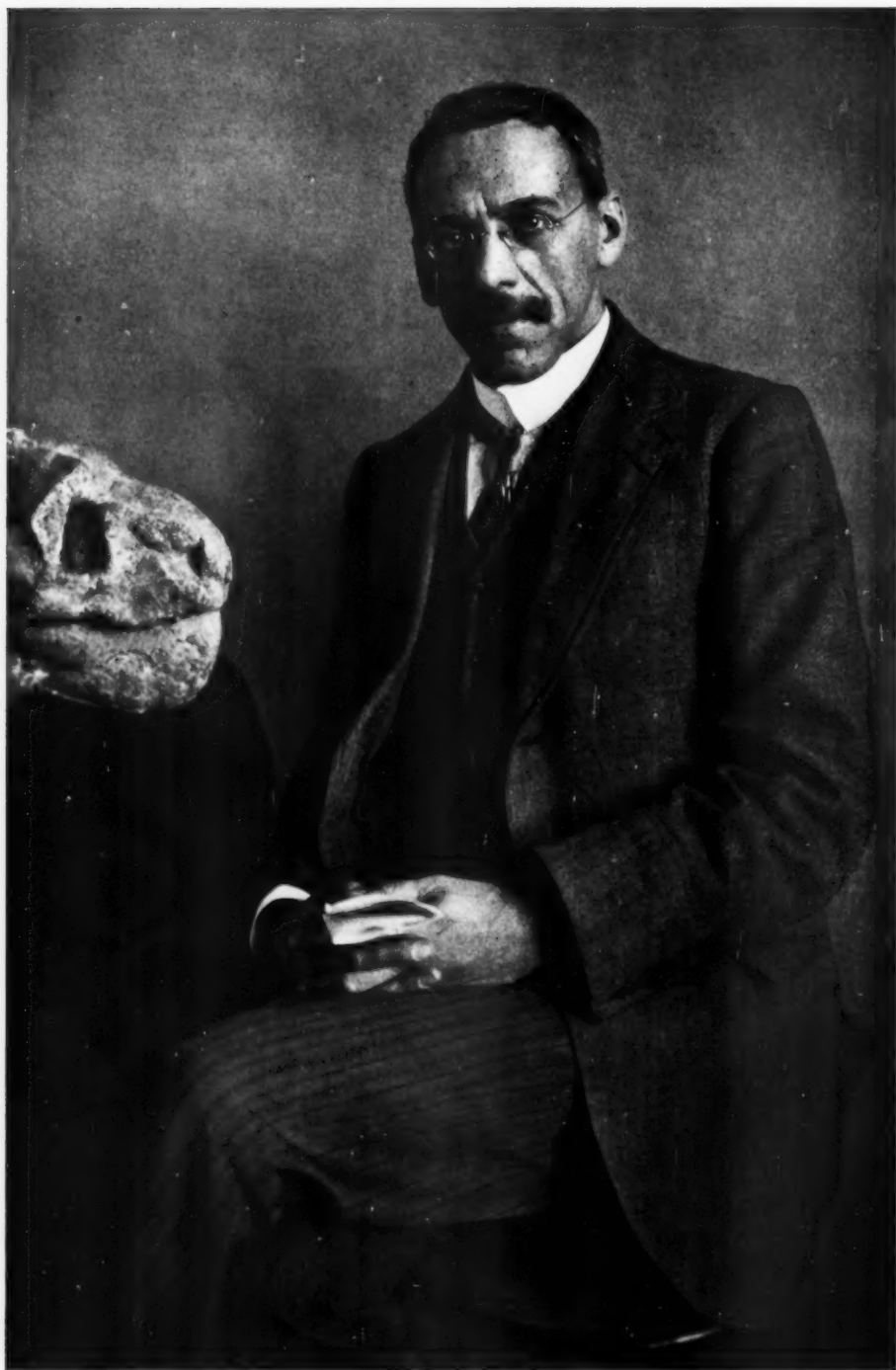
This species was not uncommon in dry woods and thickets, and I often endeavored to capture it without success, for after flying a short distance it would enter a bush among dry or dead leaves, and however carefully I crept up to the spot I could never discover it till it would suddenly start out again and then disappear in a similar place. At length I was fortunate enough to see the exact spot where the butterfly settled, and though I lost sight of it for some time, I at length discovered that it was close before my eyes, but that in its position of repose it so closely resembled a dead leaf

attached to a twig as almost certainly to deceive the eye even when gazing full upon it. I captured several specimens on the wing, and was able fully to understand the way in which this wonderful resemblance is produced. . . . All these varied details combine to produce a disguise that is so complete and marvelous as to astonish every one who observes it: and the habits of the insects are such as to utilize all these peculiarities, and render them available in such a manner as to remove all doubt of the purpose of this singular case of mimicry, which is undoubtedly a protection to the insect.

Another line in which Wallace ranks as one of the greatest naturalists is the geographic distribution of animals, beginning with his earliest observations in the *Malay Archipelago* of 1869 and closing with the publication of his charming book *Island Life*, which appeared in 1881.

Wallace like Darwin enjoyed the closing years of his life in the quiet surroundings of a beautiful English country home, and continued even to his ninety-first year to be a great force in the world's thought. His powers as a writer were prodigious and in rapid succession in his later years he brought out his volumes *My Life*, the *Wonderful Century*, the *World of Life*, and *Social Environment and Moral Progress*. In the *World of Life* he no longer believes in the Darwinian explanation of natural selection as adequate to account for the wonderful adaptations which we find in the animal world. He regards life as "a manifestation of creative power, directive mind and ultimate purpose." He thus returns in his later years to the teachings of his boyhood, to those which prevailed before the publication of the *Origin of Species*. His final creed is found in one of the closing paragraphs of the *World of Life* (p. 421):

In the present work I have endeavoured to suggest a reason which appeals to me as both a sufficient and an intelligible one: it is that this earth with its infinitude of life and beauty and mystery, and the universe in the midst of which we are placed, with its overwhelming immensities of suns and nebulae, of light and motion, are as they are, firstly, for the development of life culminating in man; secondly, as a vast school-house for the higher education of the human race in preparation for the enduring spiritual life to which it is destined.



DR. ROBERT BROOM

Dr. Broom, Croonian lecturer before the Royal Society, London, in 1913 and late professor of geology and zoölogy (1903-1910) at Victoria College, Stellenbosch, South Africa, is the world's chief authority on South African palaeontology. He has been in America for some months engaged in important comparative research on his almost unequalled private collection of South African Permian reptiles and the American Museum's large Permian collections from North America

SOUTH AFRICAN FOSSIL REPTILES

FOSSILS EXCAVATED FROM THE BLUE SHALES OF SOUTH AFRICA PROVE REPTILES TO BE THE ANCESTORS OF MAMMALS. THESE MAMMAL-LIKE REPTILES LIVED MOSTLY BEFORE THE APPEARANCE OF DINOSAURS, CROCODILES, LIZARDS AND TURTLES

By Robert Broom

Late professor of geology and zoölogy, Victoria College, Stellenbosch, South Africa

PROBABLY no question is so interesting to biologists as the origin of mammals, and few questions are more interesting to the layman. Up to 1859 when Darwin published the *Origin of Species* very few worried much about the origin of anything. The prevailing belief was that somewhere about the year 4004 B. C. the Almighty created all animal forms just as we find them to-day. A few scientists had before this time come to the conclusion from their examination of the fossils found in the rocks that there were serious difficulties in the old view, and many attempts were made to harmonize the scientific facts with the old traditions, but for the most part those who held views differing from their fathers were cautious in expressing them. After 1859 the full and free discussion of the problems gradually led to a general belief in evolution and scientists began to try to trace lines of descent. With some groups the lines of evolution were fairly manifest but with the warm-blooded animals the case presented the greatest difficulty. No other forms seemed at all nearly allied and while it was natural to assume that they must either have sprung from lizard-like reptiles or salamander-like amphibians, there was no clear evidence to decide the question.

In 1876 Owen in describing the fossil reptiles of South Africa pointed out numerous mammal-like characters seen in them and in 1880 definitely expressed the view that the primitive mammals living to-day in Australia are the direct descendants of a reptilian ancestor such as he had described. Huxley on the other hand favored the descent of the mammals from a salamander-like form and the contest between those who believe them descended from amphibians and those who look on reptiles as the ancestors has been waged ever since — sometimes rather vigorously.

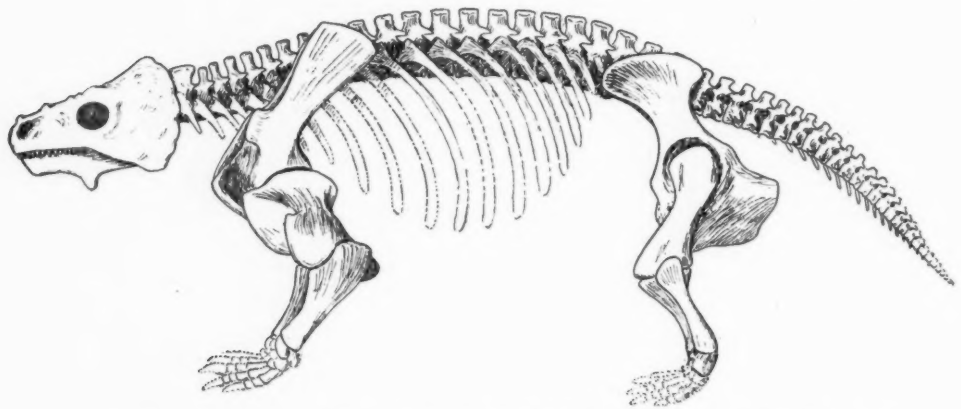
When Cope in 1880 studied the remarkable Pelycosaurs, fin-backed reptiles found in the old Permian rocks of New Mexico and Texas, he came to the conclusion that he had found, if not the mammalian ancestors, at least forms allied to them, and in this I believe he was quite correct.

Between 1888 and 1905 Professor Osborn published a considerable number of papers dealing with the origin of mammals in which he argued that the ancestor of the mammal was probably a member of that group of very mammal-like reptiles found in South Africa and called Cynodonts. This view of Osborn's seems at first sight opposed to that of Cope's but in all

probability both views were correct, the Pelycosaurs being a side branch from a direct line very near to the early mammalian ancestors, the Cynodonts being probably the immediate ancestors of the mammal.

Baur who worked here in America and died some fifteen years ago, was in favor of the reptile origin. Seeley adopted a rather curious view. He believed that the egg-laying mammals came from reptiles but that other mammals arose from amphibians. On the whole the Germans have favored the amphibians as ancestors, while English opinion although somewhat divided, has mainly been in support of the reptilian theory. The majority of Americans, doubtless influenced by Cope and Osborn, have always favored the descent of the mammals from a reptilian ancestor.

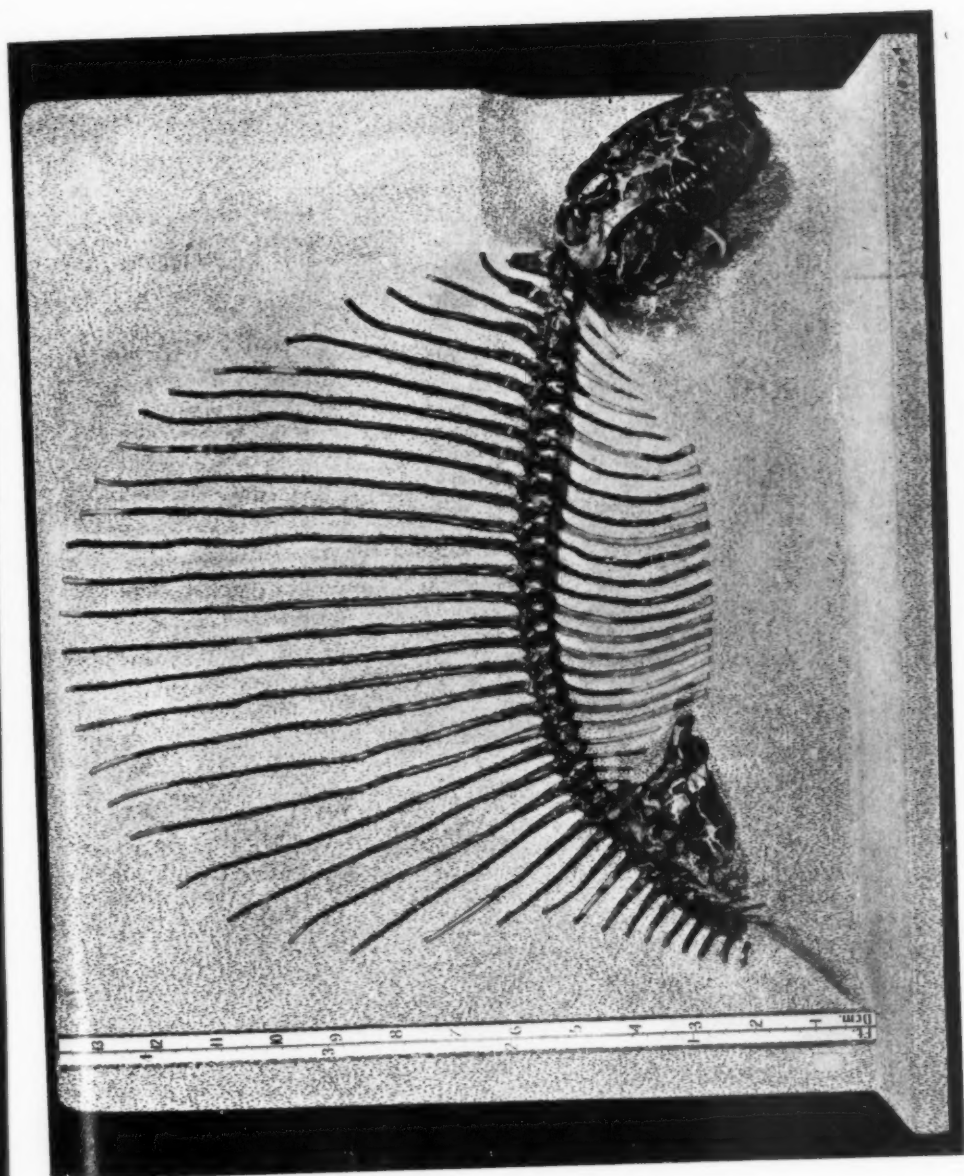
I became interested in the question in 1885 and practically resolved then that I would contribute what I could to the solution of the problem. In 1892 I went to Australia and spent some years in studying the egg-laying



Pareiasaurus serridens Owen. A restoration of a skeleton founded on the specimen in the South African Museum. Though not a mammal-like reptile it resembles them in having powerful limbs and the body lifted off the ground. The skeleton is from eight to nine feet in length and stands about three and one-half feet high

mammals and marsupials. In 1897 I went to South Africa and have been working in that region for the last seventeen years. In these seventeen years nearly every specimen that has been picked up there has passed through my hands.

We call our South African deposits the Karroo formation — naming it from the Karroo desert — and there is probably none in the world of greater interest. This formation is extensive, covering the greater part of the interior of Cape Colony, almost the whole of the Free State and much of the Transvaal, Basutoland and Natal, an aggregate area of 200,000 square miles. The formation is composed of bluish shales much like slate in color and of mudstones and there is little doubt that it has been formed of the



AN AMERICAN MAMMAL-LIKE REPTILE

Incomplete skeleton of *Dimetrodon incisus* Cope, as mounted in the American Museum of Natural History. This is one of the largest of the American primitive mammal-like reptiles. It was described by Cope who correctly recognized its mammal-like affinities

mud brought down into a large basin by a huge river such as the Amazon. Besides being of great extent, this deposit is also of great thickness, in some parts probably as much as 10,000 feet thick.

If you look upon this area as a series of rocks 10,000 feet thick and 200,000 square miles in area, and imagine it the face of a book of the history of the world, you see that it is simply a matter of our turning over the pages. There is not another part of the world that will give the records so completely — a continuous record of the land animals of the world for about three million years. Sometimes we cannot read the record clearly but we can make out most of it. This period is not only very fully recorded but there is no period of the world's history so interesting except the period when man came upon the earth. It is a period when crocodiles, lizards,



Galepus jouberti Broom, one-half natural size. A complete skeleton of a small member of the Dromasaurians, one of the earliest of the mammal-like reptiles. The head [at the left below] is folded back so that in this photograph it is seen very obliquely but with care all the rest of the skeleton may be easily traced

turtles and reptiles appeared for the first time; and the study of the records shows us the warm-blooded four-footed forms in the process of evolution.

The greater part of the Karroo formation lies in the center of Cape Colony. This large area has a scanty rainfall of from five to fifteen inches in the year but as most of the rainfall is due to thunder-storms during a short period, there are usually nine months in which no rain falls, and the vegetation is almost entirely composed of low Karroo bushes. The whole scenery is in many ways strikingly similar to that of Arizona. There are extensive plains that are almost dead level produced by the action of wind

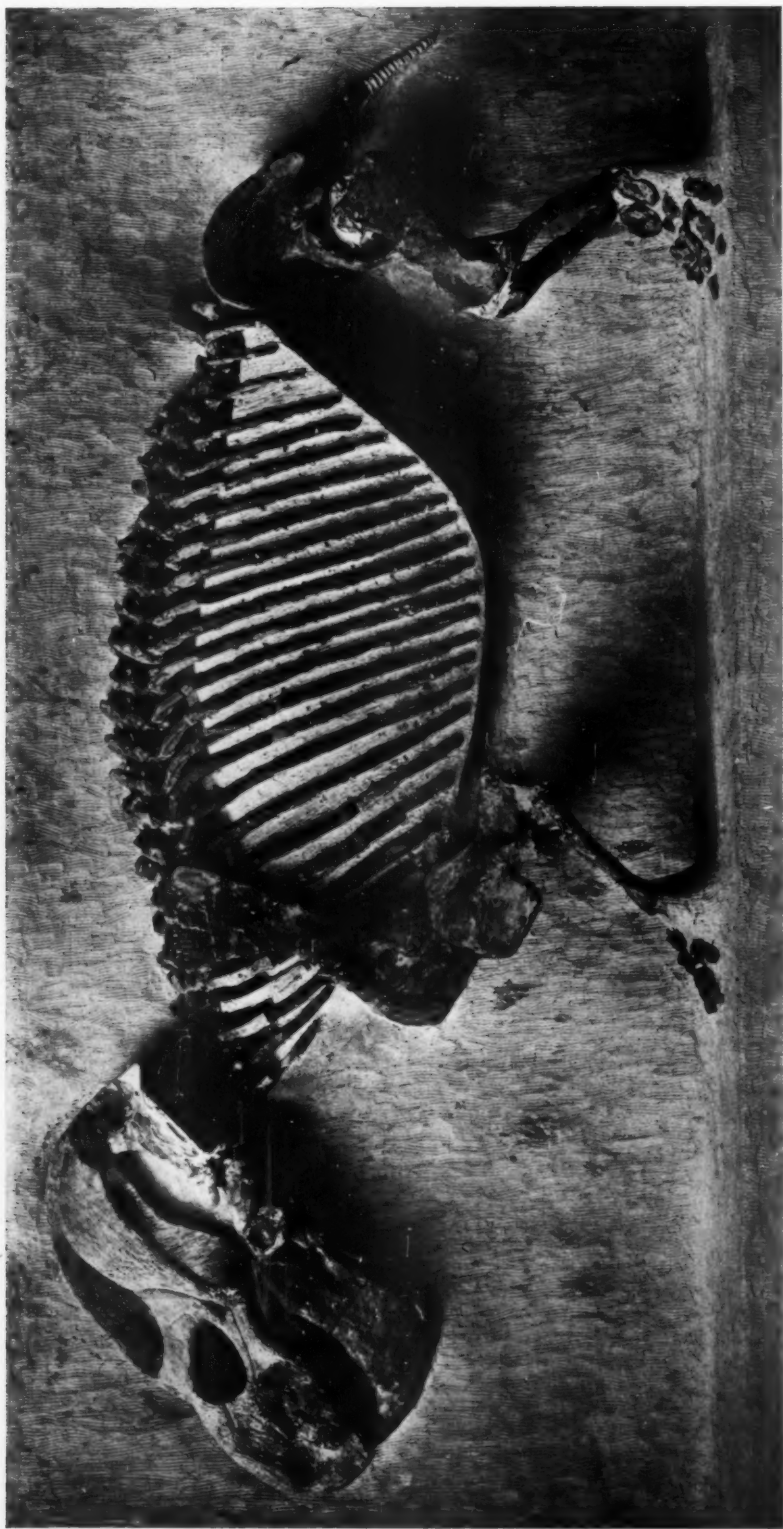
eroding exposed surfaces and filling up the hollows. Jutting out from the plains are the kopjes and mountains. These are preserved through being protected by sheets of igneous rock. In the plains, owing to the fact that almost the whole surface is covered with wind-blown dust, it is impossible to see any fossils except where the ground has been washed by a flood. On the sides of the hills in many places the shale is denuded of vegetation and exposed, and it is on these exposed slopes that most fossils are obtained. Unfortunately if a slope is steep it is extremely difficult to excavate any specimen even if discovered, the best localities being gentle slopes and the beds of rivers.

The distribution of fossils is very uneven. In some places one may travel and search over every slope of shale for forty miles without seeing a scrap of bone; in other places, sometimes in a small area of a few hundred square feet, a large number of specimens may be obtained. Bones are usually seen readily because their color is lighter than the shale. To many of the Dutch farmers and to members of their families, we are indebted for some of our best specimens, and even the Hottentot goatherds are often useful in spotting specimens while out on the hills watching their flocks.

The oldest animals we meet with in the Karroo formation in any number are of middle Permian age, shall we say of the year 18,000,000 B. C. These are of especial interest from the resemblance they bear to the American Permian reptiles from Texas and New Mexico. One of the largest and best-known animals is called *Pareiasaurus*. It is a large-limbed reptile, about nine feet in length and standing about three and one-half feet in height. In many points of its organization it shows affinities with the American reptile *Diadectes*, of which a mounted skeleton is to be seen in the American Museum. Another group of animals contemporaneous with *Pareiasaurus* is the reptilian group of Dinocephalians. These also were large reptiles with very powerful limbs. Although herbivorous and having no remarkable specialization of the spines of the vertebræ, they are nevertheless fairly closely allied to the very remarkable American fin-backed Pelycosaurs, of which skeletons are to be seen in the American Museum.

One of the most striking peculiarities of the Karroo reptiles is that almost all agree with *Pareiasaurus* and the Dinocephalians in having powerfully developed limbs. How these have been evolved is a matter of doubt but there can be little question that it was this strengthening and lengthening of the limbs that started the evolution which ultimately resulted in the formation of the warm-blooded mammals.

The best-known and in some respects the most remarkable of the Karroo reptiles, belong to a group named by Owen, the Anomodonts, from their having horny beaks like the turtles or birds with in addition in many forms a pair of large walrus-like tusks. The first specimen was discovered as far back as 1844 and was called *Dicynodon* but although many skulls have been dis-

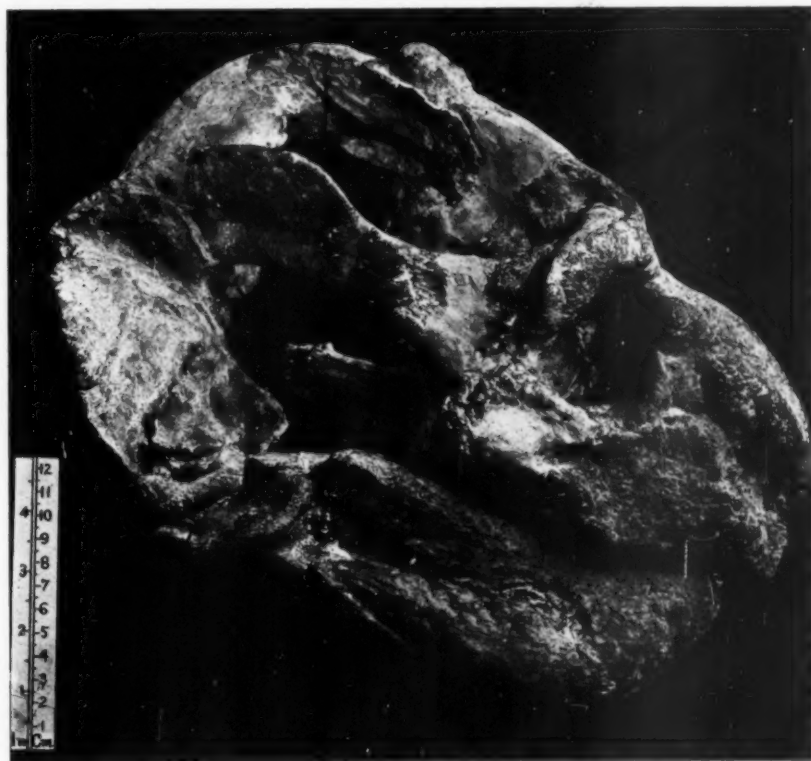


ALMOST COMPLETE SKELETON OF A MAMMAL-LIKE REPTILE

Endothiodon uniseries Owen. One-sixth natural size. The skeleton is slightly crushed, the limb bones especially being considerably flattened. This is the first nearly complete skeleton of an anomodont reptile that has been mounted and the attitude is probably very nearly correct. The toes of the hind feet are probably directed slightly outward, those of the front feet slightly inward. The resemblance of the attitude and the structure of the limbs and girdles it will be observed, are strikingly like those of mammals, and even the skull when allowance is made for the remarkable specialization of the beak, is not so very unmammal-like

covered only three or four fairly good skeletons have been found. In limbs, shoulder and pelvic girdles and essential structure of the skull and in the number of joints of the toes, they strikingly resemble the mammals and although the curious development of the beak obscures the mammal-like character of the skull it is essentially built on the mammalian plan and there is little doubt that although the Anomodonts are a side offshoot from the mammalian stem they are closely allied to the mammalian ancestor.

A form nearly allied to *Dicynodon* is called *Endothiodon*. It has no



Endothiodon uniseriatus Owen. A more perfect skull than that belonging to the mounted skeleton [see page 340]

large tusk but a number of small teeth. Although much rarer than *Dicynodon*, fortunately an almost complete skeleton has been discovered which has recently been mounted in the Museum laboratories by Mr. Charles Falkenbach under my direction, and of which a photograph is given. The extremely mammal-like condition of the limbs is very manifest, and there is little doubt that the animal waddled about somewhat after the manner of the pigmy hippopotami of Liberia, seen at the New York Zoölogical Park.



CONTRAST IN SIZE AMONG ANCESTORS OF MAMMALS

Endothiodon whartoi Broom and *Emydops minor* Broom. The skull of the largest known form of *Endothiodon* and of the smallest known of the Anomodonts



RELATIVE SIZE OF ALLIED SOUTH AFRICAN REPTILES

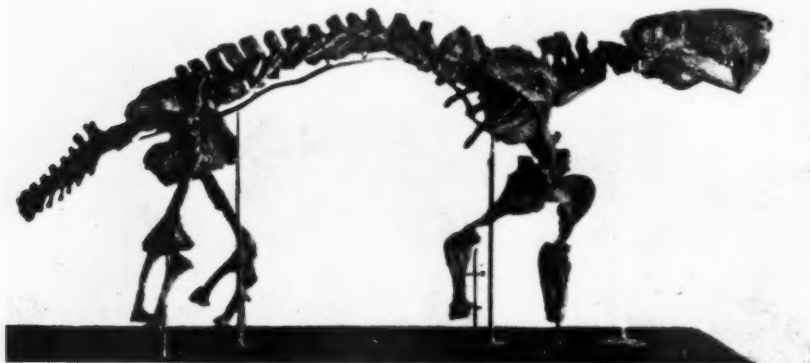
Dicynodon whaitsi Broom and *Diictodon galeops* Broom. The skull of one of the largest forms of *Dicynodon* and of one of the smallest allied forms. This specimen of *Dicynodon whaitsi* is a female in which the tusk does not project but it is present in the specimen deeply embedded in the bone.

Formerly all those specimens of dicynodont reptiles in which there was no manifest tusk were placed in the genus *Oudenodon*. *Oudenodon* was also placed by Owen in a distinct family. For years the question was debated by all workers on South African reptiles whether *Oudenodon* might not be the female of *Dicynodon* and all have concluded that the evidence seemed rather to favor their being distinct forms. No known specimen of *Oudenodon* sufficiently resembled any known specimen of *Dicynodon* to be manifestly the female of that species. Within recent years however it has become quite certain that *Oudenodon* is the female of the tusked *Dicynodon*. In at least three species of *Dicynodon* we have a manifest series of tusked and tuskless specimens and the same also occurs in other closely allied genera. In some species there is a rudimentary tusk, in others apparently no trace of tusk, while just possibly in some of the larger forms, such as *Dicynodon (Kannemeyeria)*, most probably the female is also tusked.

Exactly what the function of the tusk may have been is unknown. Many suggestions have been made which are manifestly incorrect. Pretty certainly the tusks have nothing to do with the procuring of food as the females in which they are absent doubtless got on as satisfactorily. Probably they were in *Dicynodon* at least, secondary sexual characters like the spur in the duck-billed platypus

Attention may be called to the relatively enormous size of the skull and the curious way in which the long point of the lower jaw passes up into the groove in the upper.

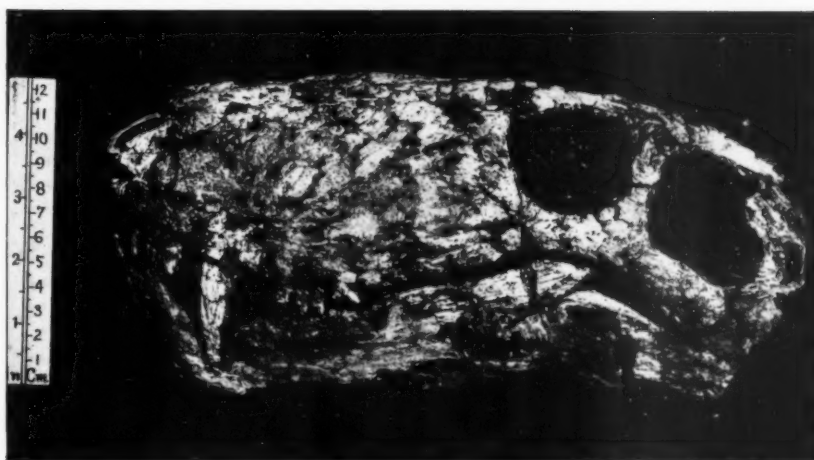
We find many other mammal-like reptiles of which the Therocephalians, Dromasaurians, and the Cynodonts are the most important. Although these insectivorous and carnivorous types are less mammal-like in some respects than the Anomodonts, they agree more closely with the mammals in the construction of the skull. They all have long, slender limbs adapted for running. The earlier members such as the lower Therocephalians, have the number of toe joints as still found in the lizards and most reptiles, viz.—2, 3, 4, 5, 3; but the Anomodonts, the lower Dromasaurians and the higher Cynodonts have the same number of joints in the toes as is retained in ourselves viz.—2, 3, 3, 3, 3. It is rather interesting to look at one's hand and



Inostrancevia alexandri Amalitsky. A photograph of a skeleton of one of the large mammal-like reptiles found fossil on the banks of the Dvina River in north Russia. The skeleton is of large size, the skull being about two feet in length and is extremely closely allied and perhaps identical with some forms found in South Africa

realize that the fingers have all these joints because a remote ancestor took to walking with the feet under the body supporting it off the ground rather than with the feet to the side as in the lizards and crocodiles.

The Cynodonts occur in the Triassic formation and a few survive into the Jurassic. In most points of structure they are extremely mammal-like and it is frequently impossible if the specimen is at all incomplete to say whether we are dealing with one of the Cynodonts or a mammal. The lower jaw is almost entirely formed by a large single bone, the posterior bones being small, and the bone on which the jaw hinges is also small thus foreshadowing the mammalian condition, the dentary bone, the angular, articular and surangular being quite small, as is also the quadrate bone. The teeth are in most forms of a carnivorous type, composed of sharp incisors, long sharp



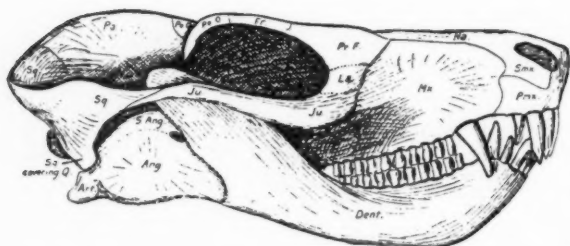
Scymnognathus angusticeps Broom. This is one of the South African forms closely allied to the better known Russian *Inostrancevia alexandri*

canines and cusped molars, the cusps being almost exactly like those of the carnivorous mammals.

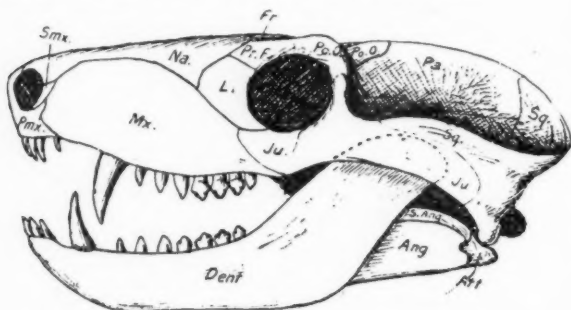
A couple of months ago I discovered that in the Cynodonts the incisors, canines and premolars are preceded by an earlier set exactly as in ourselves. It would probably be inappropriate to call them milk teeth as it is very unlikely that the Cynodonts provided their young with milk, but there can be no doubt that the young had a first temporary set of front teeth like most mammals.

Besides solving the question of the origin of the mammals, the Karroo fossil beds have thrown some light on the origin of birds. There has been considerable discussion as to whether birds were derived from flying bat-like reptiles called pterodactyls or from the dinosaurs. Some have even gone so far as to derive the flying birds from the pterodactyls and the running birds such as the ostrich from the dinosaurs. Dr. Lucas is one of those who favors a double origin for the birds. Professor Osborn some years ago argued in favor of the birds and dinosaurs having come from a common ancestor in Permian times. A few years ago I maintained, as the result of my studies on the development of the ostrich, that the ancestor of the bird though not a dinosaur was nearly a dinosaur, and that the bird and the carnivorous dinosaur were derived from a group of primitive dinosaur-like reptiles that were capable of running on their hind legs. A recent discovery in South Africa reveals just such a type as we required for the common ancestry of the birds and the dinosaurs and this form is also not far removed from the ancestor of the pterodactyl. The birds, pterodactyls, and carnivorous dinosaurs are all probably sprung from a small reptile such as the one recently discovered in South Africa and named by me *Euparkeria*.

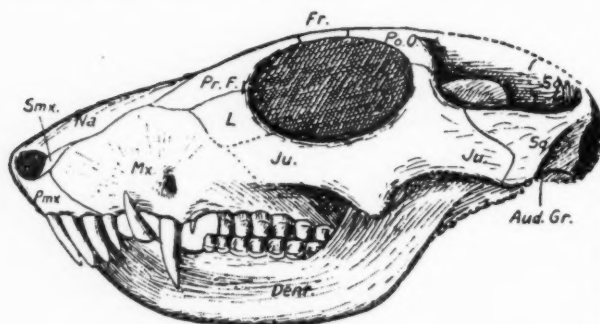
Another interesting fact that seems to be brought out by our study of the



Skull of *Bauria cynops* Broom, about one-half natural size. This is the most primitive of the very mammal-like reptiles belonging to the group of Cynodonts. The dentition, it will be observed, is like that of the mammal except in that the grinding teeth are simply little pegs not unlike those found in the armadillo



Skull of *Nyctosaurus larsatus* Owen, slightly reduced. This is one of the most mammal-like of the reptiles belonging to the Cynodonts. Were it not for the composite character of the lower jaw it might readily be regarded as a mammal



Skull of *Sesamodon browni* Broom. This is another type of cynodont reptile which is in some respects more like the mammal than any other

South African fossil forms is that it was probably the development of the active Cynodonts that led to the development of the active reptiles such as *Euparkeria*. For possibly two million years the carnivorous mammal-like reptiles had an abundant supply of food in the form of the small Anomodonts. In lower Triassic times the smaller Anomodonts seem to have become extinct for some reason and the carnivorous forms had to obtain a new diet which was probably a little lizard-like animal called *Procolophon*, and possibly other small reptiles of a similar type. It was possibly this new activity that gave rise to the Cynodonts. In upper Triassic times the *Procolophons* became extinct and the small Cynodonts were driven to attacking the more active types like *Euparkeria*. The rivalry between these forms resulted in the greatly increased activity of both, the active four-footed forms becoming the primitive mammals and those which run on their hind legs gave rise to the theropodous dinosaurs and the ancestral birds. The further evolution of the bird was doubtless the result of its taking to an arboreal habit and developing feathers.

THE STEFÁNSSON EXPEDITION AND OTHER ARCTIC EXPLORATIONS

By A. W. Greely

Major-General, United States Army, Retired

IT is interesting to note the great variety of Arctic plans that have engaged the attention of geographic travelers since the attainment of the North Pole has ceased to be a polar quest of primary and overwhelming importance. Polar exploration is not dead, it has been reborn in spirit and revived into daring and persistent action.

During the year 1912 at least a dozen schemes of exploration were launched, of which more than one-half assumed definite form as to organization and in their equipment. In view of the recent and unexpected discovery of Nicholas Second Land, it may be of interest to the readers of the *AMERICAN MUSEUM JOURNAL* to have set before them the aims and operations of the principal Arctic expeditions, eight in number, which are now being carried forward, or were recently accomplished, through the efforts of seven separate nationalities.

Three of these parties took the field during 1912, two devoting their energies to Greenland, while the third was in the nature of a preliminary voyage around Spitzbergen. The German polar expedition for the making of the northeast passage around Asia in 1913 was commanded by Lieutenant Schröder-Stranz who sailed in the "Herzog Ernst" for preliminary explorations to the northeast of Spitzbergen. Failing to push north along the east coast owing to heavy ice, he finally succeeded in reaching Treurenberg Bay, where his ship was beset and frozen in. Death and disaster were the fate of the party, with no additions to geographical knowledge.

The two expeditions for the crossing of Greenland were more fortunate, both in action and in results. The Swiss expedition, under Dr. A. de Quervain consisted of three Europeans, two Eskimo, four sleds and twenty-nine dogs. Without accident they crossed the inland ice from Disco on the west coast, to Angmagssalik on the east coast. The highest point in their route was 2,550 meters, about 8,370 feet.

Captain J. P. Koch, Royal Danish Navy, already distinguished in the field of exploration, wintered 1912-1913 on the inland ice of the east coast near Cape Denmark, in about 78° north latitude. Starting April 20 this year with five horse-drawn sledges his party crossed to Proven, a short distance to the south of Upernivik. The highest point attained on the glacial ice cap of Greenland was about nine thousand feet. Although Greenland has been previously crossed by Nansen, Peary and De Quervain an eminent geographical authority says: "Koch's crossing is probably the finest achievement of all, owing to the great width of the inland ice at this latitude."

The present year of 1913 has been a year of beginnings among the Arctic explorers, among whom it is to be said Commander Wilkitzky is not classed.

The Russian expedition of Captain Sedof sailed late in the summer of 1912 with the intention of making Franz Josef Land its base of operations for visiting the Pole.

Another expedition to Franz Josef Land has a sentimental as well as a physical aspect. This Arctic Archipelago it will be recalled, was discovered by the Austro-Hungarian expedition of Weyprecht and Payer in August, 1873, when their ship "Tegetthoff" was beset. It was first visited by Payer, whose charts of the region have been the subject of much discussion and of material modifications. Now after forty years, his son, Jules de Payer, a French citizen, is to make a scientific survey of this Arctic country. From a land base he hopes to cover the region through the use of a power boat and two aëroplanes.

The American Museum expedition under Donald B. MacMillan for the exploration of Crocker Land, and that initiated by Captain Amundsen for a drift from Bering Strait across the north-polar basin, are too well known to need comment here. The same remark may be made as to the aims and the progress of V. Stefánsson, who so distinguished himself in Arctic America as the representative of the American Museum of Natural History.

While the Arctic explorers specifically mentioned were striving for definite results, the world awakened one morning to learn that what might be called the "first blood" had been drawn by a Russian officer, Commander Wilkitzky, Imperial Russian Navy, while engaged purely on a work of domestic economy and of national interest. His voyage was the prosecution of the survey of the coast waters of northern Asia. For several years Russian officers have been busy in determining and charting a safe and reliable maritime trade-route between the valleys of the great rivers of Siberia and the remainder of the empire.

The discovery of this new Arctic land is but one of many creditable chapters in the history of maritime explorations made by Russian officers and explorers during the past quarter of a century. Unfortunately the publication in Russian text only of the results of these voyages seriously limits the dissemination of the knowledge. Among such Russian texts may be mentioned the Riabouchinsky expedition to Kamtchatka, under the direction of the Imperial Russian Geographical Society. One distinguished Russian geographer, General Jules de Schokalsky, Imperial Navy, has contributed from time to time memoirs of importance, especially relative to the sea-route to Siberia — so important to the whole empire.

As to this route, stimulated by the circumnavigation of Asia by Norden-skiöld, and by the successful demonstration by Wiggins of summer navigation in favorable seasons between Europe and the Yenisei, Russian officers have done daring work of interest and importance in the dangerous ice-clad Siberian ocean. Among these explorations are the well-known surveys of Colonel A. J. Vilitsky in the Obi and Yenisei regions, and the extended

voyages and journeys of Baron Toll in the archipelago of New Siberia, where he eventually perished. Vaguer is the knowledge had of the explorations of A. K. Volossovich between the Lena and the Kolyma, and of T. P. Tolamchef eastward from the Kolyma to Bering Strait. The surveys of Tolamchef had an important though indirect bearing on the discovery of Nicholas Second Land, for it was his favorable report on the possibility of the sea-route via Bering Strait that led the Imperial government to despatch the recent squadron under Commander Wilkitzky. Thus it happened that Wilkitzky adds his name to the roll of fame in the annals of the Russian navy.

The extent of Nicholas Second Land and its exact relations to Crocker Land and the sought-for land of Stefánsson, are not clearly understood by the general public. This is largely due to the inaccuracies and exaggerations which marked the original announcement of this discovery. Published in haste, the accounts were discussed with even greater precipitation.

One geographer, doubtless inaccurately reported, was heralded by the press as authority for the statement that the new land would prove to be "the same as discovered by Rear-Admiral Peary." It was added that "Peary claimed to have discovered what is probably the west side of it, while the Russians may have discovered the east side."

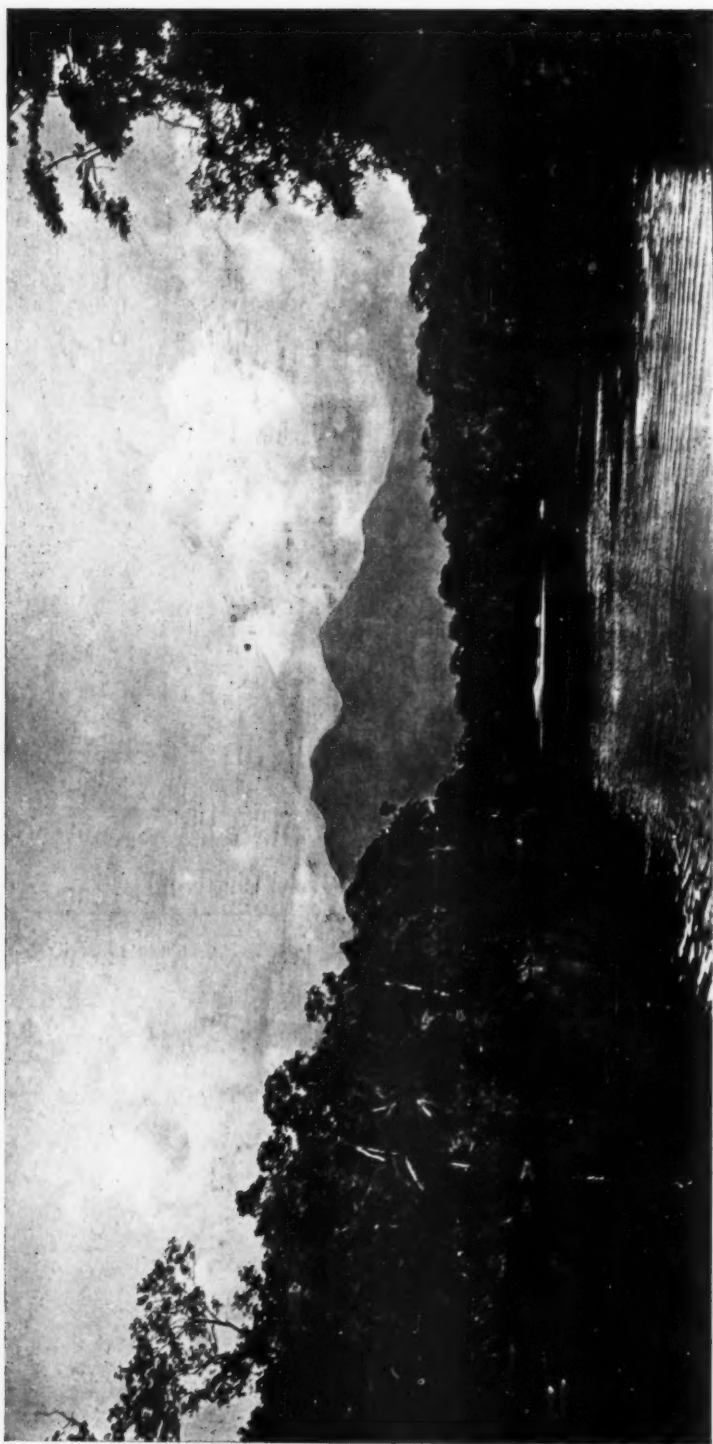
Fortunately this inaccurate newspaper report did not gain large currency. A mere glance at the chart of the Arctic regions — rarely accessible — discloses that Crocker Land and Nicholas Second Land are more than twelve hundred miles apart. It is another physical fact that the "Fram" drifted across the eastern half of the north-polar basin along a route that lies between the two lands.

In some quarters there arose doubts as to whether or not Stefánsson had been forestalled in his aims by Wilkitzky as Scott had been by Amundsen in the Antarctic. That the Canadian authorities were at first in doubt as to the true relations of the two lands, was asserted by the daily press.

Fortunately such fears and apprehension are groundless. Nicholas Second Land can in no way extend eastward to such an extent as even to approach the lands which are believed to exist in the million square miles of unknown regions within the Arctic circle. Crocker Land is situated in the western hemisphere, in about 104° west longitude, while Nicholas Second Land is in the eastern hemisphere, in about 100° east longitude. The two lands are therefore on diametrically opposite sides of the north-polar ocean.

Meanwhile, on the report of Commander Wilkitzky it is known that Nicholas Second Land is not of continental dimensions, but rather is a narrow land, probably of closely-joined islands. It may perhaps be some two hundred miles long by forty or fifty wide, having possibly half the area of the islands of Nova Zembla.

Certainly all readers of the AMERICAN MUSEUM JOURNAL will rejoice with the writer that our Canadian friends, with their able leader Stefánsson, have a free and unvisited field of exploration open to their Arctic expedition of 1913.



IN THE LAND OF THE MAQUIRITARES

The twin peaks of Duida in the distance. This is the mysterious mount of the Maquiritare Indians who believe it the abode of evil spirits. In the rainy season gray mists perpetually enshroud it, cold winds sweep from it over the forests, deep rumblings and continual flashes of lightning tell of the storms among the granite peaks

TO THE MAQUIRITARES' LAND

By Leo E. Miller

Leader of the Upper Orinoco Expedition of the American Museum

A NY attempt to give a comprehensive account of the movements and results of the Upper Orinoco expedition within the confines of a short magazine article is a difficult undertaking, partly on account of the great distance traversed and partly because of the numerous discoveries and incidents of interest and importance attendant upon the exploration of this all but unknown part of South America.

In the latter part of November, 1912, the writer, accompanied by Mr. F. X. Iglseider as assistant, sailed from New York to Trinidad and thence across the Gulf of Paria and up the Orinoco to Ciudad Bolívar, two hundred and forty miles from the mouth of the turbulent muddy stream. Here a week was spent in provisioning the expedition and in chartering a sloop to carry ourselves and the rather appalling amount of cumbersome equipment to the foot of the cataract of Atures, the first effectual barrier to navigation. The low stage of the water at this, the dry season, together with the numerous, barely submerged rocks and shifting sand-banks render steamboat navigation so hazardous that no attempt is made to ascend higher than the mouth of the Apure. Sailboats of light draft are therefore the only craft available. This latter mode of travel is further facilitated by the prevalence of a steady easterly breeze which with darkness often assumes the proportion of a squall or *chiguaco* as it is called.

The journey from Ciudad Bolívar to Vagré, the port of Atures consumed seventeen days, from December 17 to January 2. A half day had been spent at Caicara and a full day lost below El Infierno waiting for a strong enough breeze to take us through that seething gorge.

Dugouts served to convey the luggage from Vagré to Zamuro a short mile away, and thence the league to Atures on the south bank of the Rio Cataniapo, was covered in ox-drawn carts and other dugouts. At the town of Atures we were hospitably received by General Roberto Pulido, governor of the Department of the Upper Orinoco, and next day proceeded to Salvajito, another league overland. Here we found anchored a trim kerosene launch, capable of taking the expedition to Maipures, the next stage of the journey, in half a day's time. But great was our disappointment to learn that the owner requested the modest sum of four hundred dollars for the service. By no dint of argument could he be persuaded to reduce this figure, for in true Venezuelan style he reasoned that we were sorely in need of his services and must eventually concede to his demand. But in this he was mistaken. One other way of travel lay open, — namely, by a small dugout canoe, and to this recourse was of necessity taken, although three trips were required to transport all the equipment.

Finally, on January 6, in the afternoon, I started with three natives — the canoe so heavily laden as to leave less than three inches of free board above the water — and reached the port of Maipures on the Rio Tuparo before noon of the eighth.

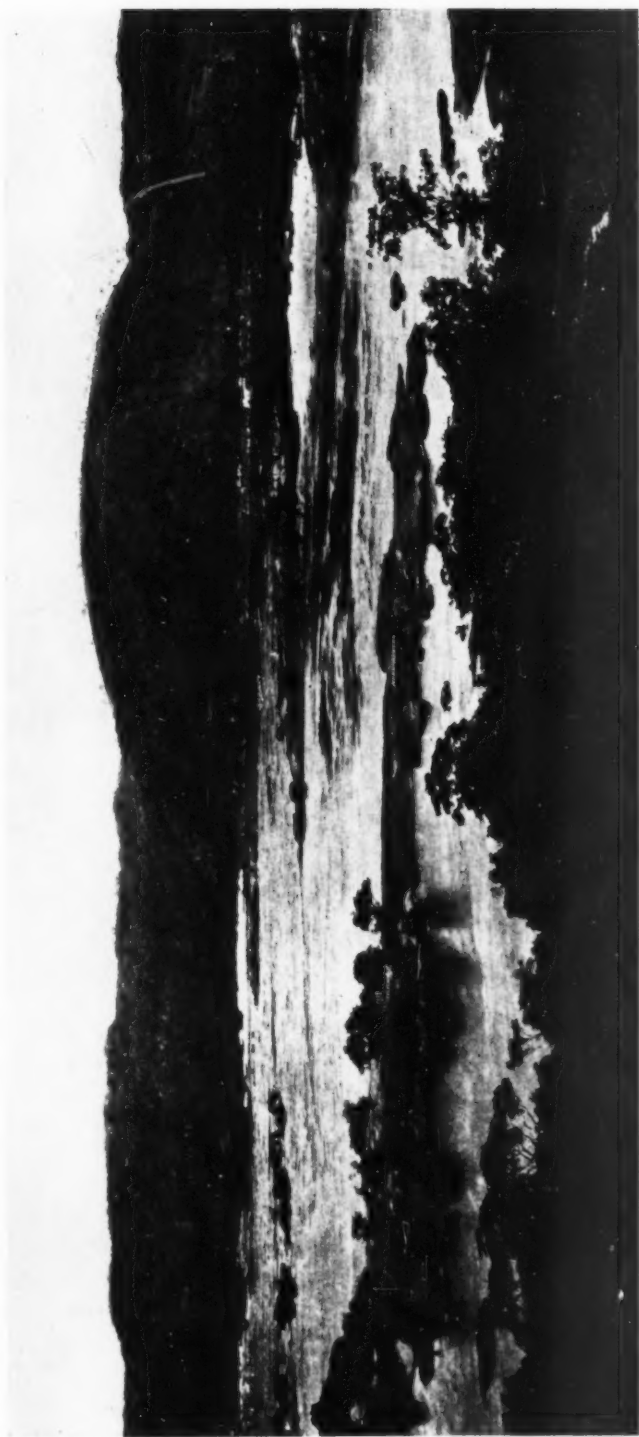
The canoe and two men were immediately sent back to Salvajito, with instructions for Mr. Iglseder to come with the next load. In crossing the rapids of Guajibó, a short distance below the mouth of the Tuparo, one of the natives was lost together with the canoe, and the rest of the party remained stranded on an island nearly two days, until rescued by a passing party of Guajibó Indians.

The portage at Maipures is only three miles across savanna country, interspersed with huge granite boulders and small clumps of forest. During my enforced stay I had ample time to explore the surrounding country and visit the rapids, three in number, which here obstruct the river. The falls of the Carretia, said to be about thirty feet high, block the eastern arm of the Orinoco, which is divided into two branches by the great Isla de Raton. Small collections were made, as well as photographs taken of the rapids, vegetation, and wonderful granite formations. It would be difficult indeed adequately to describe some of these towering blocks of stone, cracked and weathered into fantastic shapes, partially covered with creepers and surrounded by a low growth of spiny palms and gnarled stunted trees. Clumps of pineapples, cacti, and various species of thorny shrubs growing in cracks in the ledges impart to patches of the country a desolate and decidedly desert-like appearance.

Along the river huge masses of rock were exposed by the low water, showing caves, grottoes and other marvelous formations. Many of the sloping ledges are honey-combed with hundreds of pot-holes of various sizes and degrees of perfection.

A large *piragua* conveyed the expedition to San Fernando de Atabapo in six days' time. We had anticipated easily securing the required native help here, but found that nearly every available man had gone to the rubber camps up the river. It required several days to enlist the number sufficient for our purpose. Then began the arduous voyage on the upper Orinoco. Great playas stretched along the banks almost continually, some of them many miles in length. In many of these, vast numbers of turtles deposited their eggs at night which were eagerly sought in the early morning by Indians and "coro-coro" ibises. Sand-flies, which first became troublesome in Atures, were always present in incredible myriads making the hours of daylight almost unbearable.

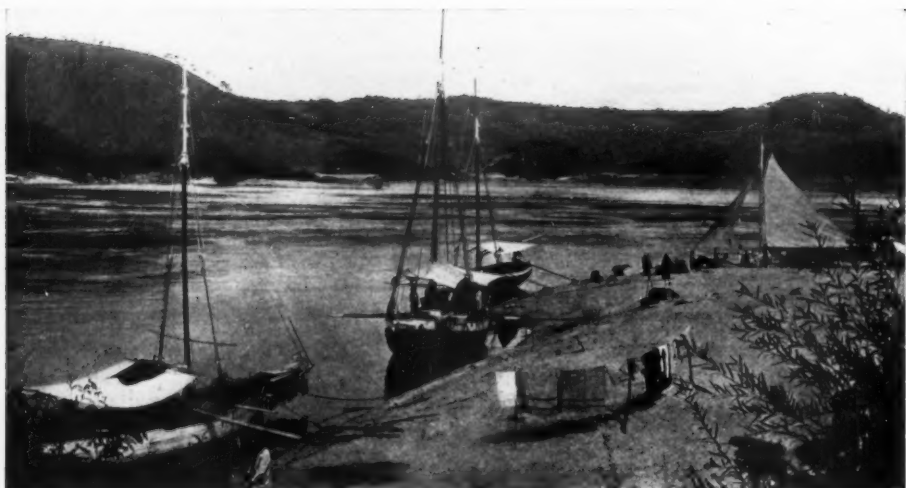
The delta of the Ventuari was reached February 8, and for three days we struggled in the rapids that end in a decided fall named Santa Barbara. The strong north wind and monstrous waves added greatly to the difficulty and danger of running this series of rapids. Numberless islands, some of



THE RAPIDS OF ATURES

The rapids at Atures with tumultuous channels of water between rock islands, make the first effectual barrier to navigation in the Orinoco. For forty miles, from Atures to Malpures, the river is impassable and presents varied scenes of grandeur.

The expedition reached this point by sailing from New York to Trinidad, thence across the Gulf of Paria and up the turbulent muddy Orinoco 240 miles to Cuidad Boll'var, thence a seventeen-day voyage by sloop. The voyage of 240 miles to Cuidad Boll'var Boll'var is open to tourist travel



Vagre, the port of Atures, was the first stop after passing Ciudad Bolívar where the final provisioning of the expedition had been accomplished. At Vagre the outfit of the expedition was portaged around the rapids



Loading the outfit at Atures. The expedition traveled by dugouts one mile on from Vagre and thence in ox-drawn carts to Atures town along the south bank of the Rio Cataniapo. Atures gives the first experience of the terrible insect pest of the upper Orinoco



Atures town on the Orinoco. The river here presents the northern face of the forty miles of rock and cataract blocking navigation. The cataract sends up a roar heard continually not only at the town but also fully a mile away



Loading equipment at the port of Maipures. A dugout canoe was the means of travel from Salvajito (a league overland from Atures) to the port of Maipures — a dugout so small that three trips were necessary for the transportation

considerable size and all heavily forested, block the mouth of the Ventuari, while the many channels into which the river is divided are thickly sprinkled with granite boulders, amongst which the water swirls and rushes at a terrific rate.

Life on the upper Orinoco at this season is at its height. It was unusual not to pass a number of rubber camps in the course of a day's travel, which always presented a scene of life and activity. It was hard to believe that within a few short weeks all signs of life would vanish and the sites of the camps themselves disappear in a rapidly rising, muddy lake. At many of these camps we were hospitably received, while at others the reception bordered on open hostility so that we deemed it safer to spend the night aboard the little craft or on some vast sand-bank beneath the brilliant constellations.

Daily we strained our eyes for a first sight of the stupendous stone formation which was our goal, and in the afternoon of the twentieth we were rewarded with a first faint view of Duida, the mysterious mount of the Maquiritaes. It loomed dim and indistinct in the far distance, a high flat-topped plateau, but presently the mists shifted and revealed two peaks of equal height on the southeast end. A moment later the whole was hidden by rolling masses of vapor. We did not have another view until several days later.

There are two things so typically characteristic of the Orinoco that I cannot refrain from giving them mention. One, the large flocks of *hoatzins* that appear morning and evening in the dense brush that lines the river banks and the other, the schools of porpoises that appear unexpectedly at almost any time of day or night. The latter often remain in the immediate vicinity of a boat an hour or more, coming to the surface frequently to raise their long narrow snouts from the water, give a deep coughing sound and disappear.

Toward the Orinoco, Duida presents a bold front — a sheer cliff hundreds of feet in height. The seven miles of intervening country, between river and mountain, consist of marshes and undulating plains covered with a dense growth of thorny vegetation. Progress through such country is extremely difficult and upon reaching the base of the mountain at this point it seemed that we should doubtlessly be obliged to make wide detours as the barren cliffs are apparently unscalable.

It was therefore decided to ascend the Rio Cunucunuma, a small stream coming from the northeast and entering the Orinoco at right angles. Once within the comparatively narrow confines of this caño, the surroundings are vastly different from the Orinoco and as wild and tropical as one could well wish.

The forest is of towering height generally extending to the edge of the water, forming impregnable walls covered with a dense and even growth

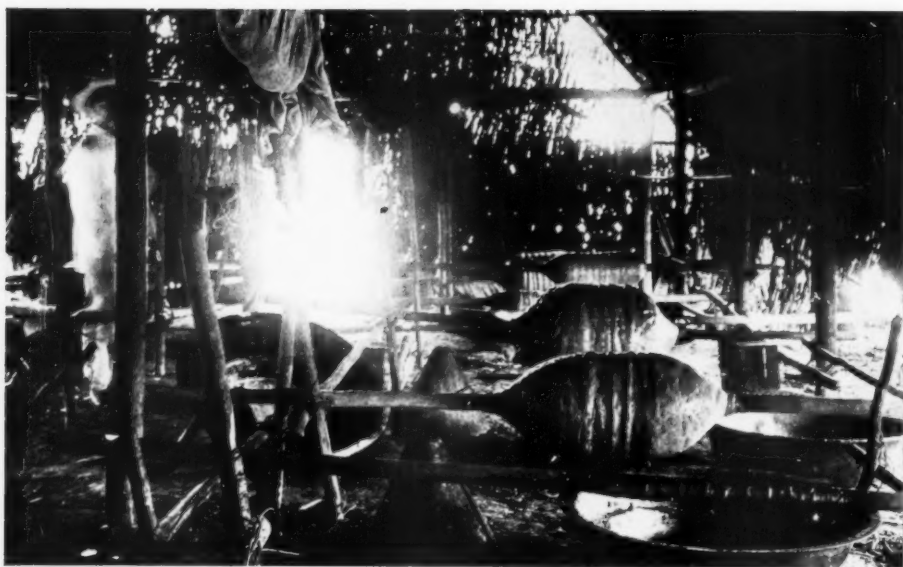


The canoe on its second trip, while crossing the rapids of Guajibo, here met disaster; one of the natives was lost and the others of the party were imprisoned on an island two days until rescued by passing Indians



The savanna country about Maipures is interspersed with huge granite boulders in small clumps of forest. Sometimes rocks of fantastic shape tower to great heights amid vines, palms and gnarled trees.

Maipures is at the southern face of the great rocky bulwark that crosses the river and divides it into the lower and the upper Orinoco



The interior of a rubber camp. On the upper Orinoco the expedition found difficulty in securing help because all natives had gone to the rubber camps along the river beyond. In February these camps present scenes of life and activity to be replaced in a few weeks by primeval solitude



Method of making portions of the trip up the river Cunucunuma. Raudal de Sina near the encampment of the Maquiritare chief. The expedition's temporary camp was made on the shore and the trail to Duida begun

of creepers. Myriads of palms, tall and slender and of many species, rear their heads above the dark green canopy. The water of the stream is of a deep reddish color and so clear as to permit an unobstructed view of the teeming life that flits like shadows over the sandy bottom. Notable among these are rays and electric eels of formidable size, adding very materially to the dangers of navigating the smaller streams.

A number of Indian plantations which we visited were entirely deserted, but the large conical huts furnished convenient stopping places for the nights and the fields provided an abundance of fruits and vegetables.

We made slow headway on account of the swift current and numerous cataracts. After seven days of the most strenuous kind of work we reached Yacare, the encampment of the Maquiritare chief, Antonio Yarecuma, a



Duida stands some seven miles from the river. A trail was cut across the intervening low hills with foot-bridges of felled trees over the small streams to our base of operations at the foot of the mountain. Duida is not an isolated mountain "island" as supposed but connected by hills with the Ventuari and Parima ranges

short twenty miles from the mouth of the river. Finding the place deserted, we descended a short distance to near the mouth of a small creek known to the Indians as the Sina. Here a tract was cleared and a temporary camp pitched.

Duida, which was usually visible a few minutes at or near ten in the morning, rose boldly but a short distance away. Between us lay a series of low hills covered with comparatively open forest and swampy valleys intersected with small streams. A short time after our arrival our captain succeeded in recruiting five Indians and the entire force was at once set to cutting a trail to the foot of the mountain, where the base of supplies and



Maquiritare Indians live in small groups scattered at short distances along the river in the vicinity of Mount Duida. Neither these nor other Indians of the Orinoco region make good assistants on a scientific expedition



The Maquiritare plantations had been wholly deserted for the rubber camps but we were grateful for their huts as shelter at night

operations was to be established. Several windfalls of considerable width had to be cut through and trees to serve as foot-bridges felled across a number of streams. This required considerable time but the work on the whole progressed most satisfactorily and in a week nearly four miles of trail, or over half the estimated distance to the mountain had been completed.

Then came the first signs heralding the approach of the rainy season. The mists that now perpetually enshrouded Mount Duida assumed a deep gray tint and there sprung up suddenly and at frequent intervals cold winds that swept over the forest with cyclonic velocity — bringing many of the great forest trees crashing to the ground — accompanied by vivid flashes and ominous rumblings that clearly told of the forces at work among the lofty peaks.

The Maquiritares, in common with many tribes of South American Indians, are imbued with the belief that the mountain fastnesses are the abode of evil spirits and at the first clash of the elements our Indians showed great uneasiness, finally disappearing under cover of night, taking the boat. Their departure, while appalling at first thought, was not a serious matter on account of the close proximity of Yacare to which numbers of Indians would return at the close of the rubber season, but a few weeks off. Provisions and ammunition we had sufficient for six or eight months.

At this time Mr. Iglseder suffered a severe attack of malaria and the men were immediately sent down the river on an improvised raft to bring a boat from Trocoapure, a rubber camp on the Orinoco. When they returned beriberi had set in and Mr. Iglseder's condition was so serious that retreat was not only necessary but instant flight imperative. Favorable conditions attended the return and in nine days San Fernando de Atabapo was reached.

The collections of birds are large and have yielded a number of new species and one genus new to science. Other results of the expedition are most interesting and surprising. Mount Duida is not the isolated mountain "island" as was supposed, but is connected with the mountains of the Ventuari and Parima Range by a series of hills. Its elevation is comparatively low, being less than six thousand feet. Any attempt to reach the top, which to all appearances is rugged bare granite, should be made from the west, as the slope is gradual and forested for a considerable distance up.

To secure the best results, assistants should be taken from Trinidad, as both Venezuelans and Indians are untrustworthy and totally lacking in intelligence. The dry season is much shorter than in the lower Orinoco and work must be pushed with all possible speed.



Totem poles in the almost deserted village of Kitwinskole¹

SOME KITKSAN TOTEM POLES

By George T. Emmons

Lieutenant, United States Navy, Retired

UNDER the general name of Tsimshian, are included the three dialectic divisions of that linguistic stock which occupies the extreme northwestern coast of British Columbia and the valleys of the rivers that reach the sea thereabouts.

NOTE.—The Museum has on exhibition a large number of totem poles from various parts of the North Pacific Coast, and many of the most valuable collections made by Lieutenant Emmons are the property of the institution.

¹ A wealth of elaborately carved heraldic columns is to be found in the old and almost deserted village of Kitwinskole on the Kitwinskole River some twenty miles inland from Kitwingach, on the old trail to the Nass River. These columns are fast going to decay, but are still treasured by the owners who return here for their potlatches and burial ceremonies. The photograph shows the northern portion of the village from in front of the house of the head chief of the Lakyebo clan.

Specifically, this name belongs only to the dwellers of the seaboard. Its meaning, "in the Shian" (the native name of the Skeena River) marks them as sojourners within the confines of the river, and this they were, for their permanent villages were on the coast and they resorted to the lower river only during the fishing season to procure their winter food supply of salmon. The inhabitants of the valley of the Nass are known as Niska and those who live on the upper reaches of the Skeena and its tributaries, beyond the cañon, are the Kitksan [Kitishian]—"people of the Shian," implying a permanency of residence on and an ownership of the river. This inland division claims to be the parent stock from which both the Tsimshian and the Niska have descended.

The oldest local traditions of the Kitksan go back to the subsidence of the flood, when those who were saved landed on the north bank of the river just below and across from the mouth of the Bulkley and founded *Tahm lah halm* which is so often mentioned in song and story. Here they remained for many generations until they became a great people, and to express their numbers, the old native who gave me the following account of their dispersion said that when the geese in their migration were passing over the village, the assembled multitudes would raise a mighty shout and the frightened birds would fold their wings and fall to the ground. After a season of extreme cold, snow continued to fall late in the spring long after the salmon should have run in from the sea, and starvation looked the people in the face. Driven to desperation and resentment against the spirit of the cold, an old chief soaked a dried salmon in water until it assumed a fresh appearance, and spitting it after the manner of cooking the fresh fish, he went without the doorway and in a loud voice reviled the ice spirit saying, "You have no strength, you are but a weakling, you cannot hurt us and keep the salmon away. See the fresh new fish I took this morning, see it ready for the fire!" This so incensed the spirit that it sent a mighty flood, the ice in the river gorged and then the water rose and bursting its bounds swept all before it, and in consternation the people fled and in small bands sought new homes, some following the river to the coast, others crossing overland to the bars while those who remained settled at favorable points along the upper river. Other versions of the dispersion are quite different in detail but all agree in the fact that the want of food after an extended period of extreme cold caused an exodus and a division of the people.

The Kitksan comprise seven geographic divisions that might best be termed village communities or bands, each one of which has a fixed village within well-defined territorial limits for hunting, fishing and berry-gathering although travel by the river is open to all. These divisions take the names of the villages with the prefix of *Kit*, "people." Each community is composed of two or more of the four totemic clans living together through the necessity of intermarriage and for social and protective purposes. The

villages are all on the main river or its tributaries, the houses are arranged in one or two parallel lines on elevated beaches overlooking the water. The clans are grouped together. But to-day under missionary influence the old villages are being deserted for new sites or when still inhabited the primitive communal houses are giving place to small modern dwellings, and with the building of the Grand Trunk Railway through the country every vestige of the old life will soon disappear as will the people themselves.



THE KILLER-WHALE [AT THE LEFT] AND "BEAR-UNDER-WATER" AS CREST FIGURES IN FRONT OF A CHIEF'S HOUSE

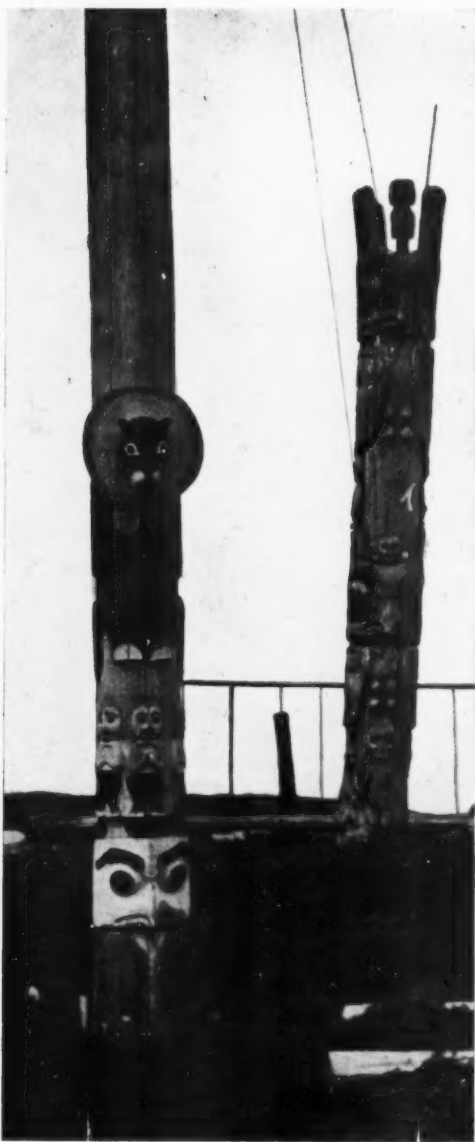
In some instances individual crest figures are placed on platforms in front of the houses and serve the same purpose as the heraldic columns in displaying the emblem. In the village of Kishpiyeux in front of the house of Gaal, chief of the Kish-hash clan, are large painted wooden figures of the two principal crests of the division — the killer-whale, indicated by the curved dorsal fin with the circular hole in the base below the horizontal white stripe, and the mythical "bear-under-water" in which a horizontal striped dorsal fin rises above the back of a bear figure. Between these two is a tall, slender, tapering pole, carved and painted to represent a snake. The head is black and a black line extends the entire length down the middle of the back. It is slightly octagonal in form and the sides are adzed to represent scales. The snake is a crest of Chief Gaal's direct family, not a general clan emblem. It comes to them from the killing of an immense water-snake by one of the family in early days, after it had destroyed many people and its last victim was a young woman of the family who is represented by the carved head half hidden by the grass, below the snake's mouth. This use of the snake as a family crest and its display on a totem pole is the only instance of the kind that I have seen among the Kitsan or other divisions of the Tsimshian people

The social organization of the Kitksan is founded on matriarchy, and consists of four exogamic clans composed of households, each under its immediate house head, but all acknowledging the general authority of a hereditary chief who presides over the councils in the discussions of all family affairs. The clan is the unit of political and racial life. Individuality without the clan does not exist. The act of one is assumed by all, and a very exact code of well-formulated laws governs the relations of these bodies to one another. The members of a clan may marry in any of the other three divisions. Descent being in the mother's line, rank and property always remain in the clan. The brother or the maternal nephew succeeds to the chieftainship and the wife of the deceased retains her position in the household only by marrying the successor.

The clans take their names from their principal emblems, the wolf, the eagle and the raven or frog, except in the case of the Kishhash — "people of the fire-weed" — who are represented by two or more equally important animal motives. A number of subsidiary emblems are claimed by each clan and others of less importance belong to households only.

In Kitwingach is a very elaborately carved column of the Kanhada clan in which the frog crest is represented to the exclusion of the raven. At the base is a bear figure in the position of having been strangled in the noose of the twisted rawhide snare; above this is a frog, then a story of the household is told by the canoe with three heads: — In a Haida raid on the village a woman of the family was carried away to the Queen Charlotte Islands. Her captor treated her so cruelly that she killed him and cut off his head, and making her escape in a canoe with her child she crossed to the mainland and finally reached her home. The canoe typifies her escape, and the three heads represent in succession the mother, the child and the husband. Above the canoe is a human figure holding a frog and seated on the head is the small owl *mardex* (which is a clan emblem) holding a frog





Another column of the Kish-hash clan illustrates the story of the bear that lives in the moon and carries children away from the earth. At the base is represented the great horned owl (*gwute gwu nooks*) a clan crest; above, three children, and finally the bear with its head through the full moon, which latter is also a crest of this family. Beyond and to the right is a very old and beautifully carved Kish-hash column representing two owls and several small human figures

The emblem is displayed upon articles of ceremonial dress and festival paraphernalia but more particularly and with greatest effect upon the heraldic columns or totem poles that characterize the villages of this people.

These carved columns which form the most conspicuous and attractive feature of the old settlements differ materially from those of the coast tribes. They never form the entrance of the house as with the Haida, nor are they used as mortuary receptacles for the ashes of the dead. They are never placed within the house forming the supports for the roof beams as with the Tlingit and others, nor do they stand in contact with or alongside of the dwelling, but in every instance they form a quite regular line parallel with and the distance of a broad roadway in front of the houses. They are less massive than those of the coast, which is the natural consequence of the smaller tree growth of the interior, but while often slender they are very tall. Cedar is the wood generally used and much preferred from its fine grain, lightness and supposed durability. Some columns are elabo-



THE SAVAGE "HOW-HOW" IS A FAMILY CREST

In the village of Kitwingach, on a line with the old grave enclosures, but standing by itself in an open space between the two rows of houses, is a boxlike platform on which stands the rather crude figure of an animal known as "how-how." As the story goes:— In old times a savage animal different from any known to the country made its home on a wooded island in the Skeena River and preyed upon travelers and hunters camping thereabouts, until finally it was killed by one of the Lakyabo clan. To commemorate this exploit it was taken by his household as a particular crest and as such is displayed both in this manner and surmounting carved columns in front of the houses.

The legends of the Tsimshian and associate people are replete with stories of mythical beings and fabled monsters that are believed to exist or to have existed, and from encounters or association with these by their ancestors, families have assumed crests that have no known prototype. But these are generally of the water or the air and are very complex in form, while the representation of the how-how is a simple animal figure, although wholly unlike that of any species common to this locality. I would suggest that the story might be really true, and that the animal unknown to this people might have been a mountain lion, so common to the more southern and interior portions of British Columbia, that had wandered across the mountains and failing to find a sufficient food supply in its new home had attacked stray travelers along the river. The bear is the only dangerous mammal in this section and the people are so well acquainted with it that they could never mistake it for any other animal. And the native artist in his greatest latitude would never represent the bear form with the peculiar type of tail which always characterizes the representations of the how-how and which corresponds so well to that of the lion

rately carved throughout their length and those of greater girth are more often hollowed out or flattened along the bank for ease of handling. Others are carved with one or more figures at the base and at the top with the inter-

vening surface adzed or the natural tree trunk with the branches and bark removed. I believe that when erected all columns were painted in the native colors of red and black and sometimes white but time and the elements have obliterated all traces of color in the older ones.

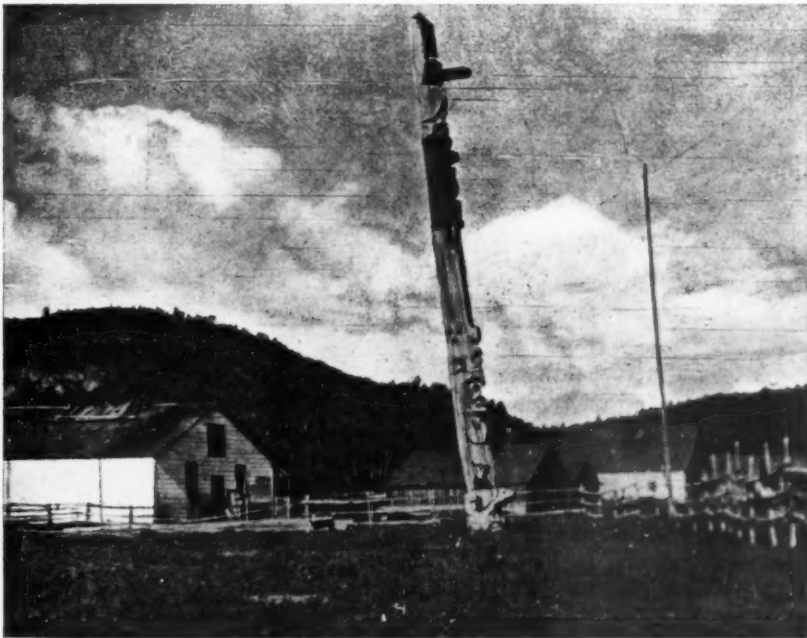
It is by means of these carvings that this people without letters, have recorded and preserved their history, which includes their legends of origin, their hero tales, their clan affiliation and particularly such household or family events as are of more than passing interest. The erection of the column usually follows the succession to the head of the family or the building of a new house, and besides honoring the memory of the dead it increases the importance of the living and reflects glory upon the clan at large. Human and animal figures, one superimposed upon the other, are represented. These are generally in low relief because of the character of the field of ornamentation — which is a tree trunk of moderate diameter and considerable height standing wholly without support. The front and sides of the pole are carved while the back is a solid plane surface which preserves



Before the advent of Europeans the coast and river tribes were continually carrying on war by means of raids. In one of these a great war party of Haidas ascended the Skeena River and surprised the people of Kishpiyeoux when many of the men were away. They burned the village and took back to their island home many women as slaves. One of these later made her escape in a small canoe and returned to the village. Upon her death a memorial column was raised to her memory. She is represented at the base, and a small Haida canoe suspended across her body illustrates her means of escape. The eagle, her clan emblem, is shown over her head and surmounting the pole. This woman killed her husband and cut off his head before making her escape with her child and originally there were three carved wooden heads in the canoe

the strength of the column to withstand the heavy winds that sweep through these river valleys. While most of the figures are more or less conventionalized, particularly those of human beings, mythical animals and bears, yet the Kitsan are very independent in their treatment of most other animal forms, and represent them in many different positions very true to nature. This is particularly so in the case of the bird figures that so often surmount the poles. It is customary to give the clan or house crest the place of honor at the top of the pole and more often too at the base, while more for ornamental purposes it may figure in many positions between, where also may be pictured some family story or exploit or some connection through marriage. Every figure represented here has some clan or household significance although the present generation cannot always account for the appearance of human figures on some of the older columns.

To-day the old columns are fast going to decay and their places are not being supplied by new ones. And with the loss of interest in this custom is a growing ignorance which in a few years will result in much difficulty if not in an impossibility in interpreting these old stories in carved tree trunks.



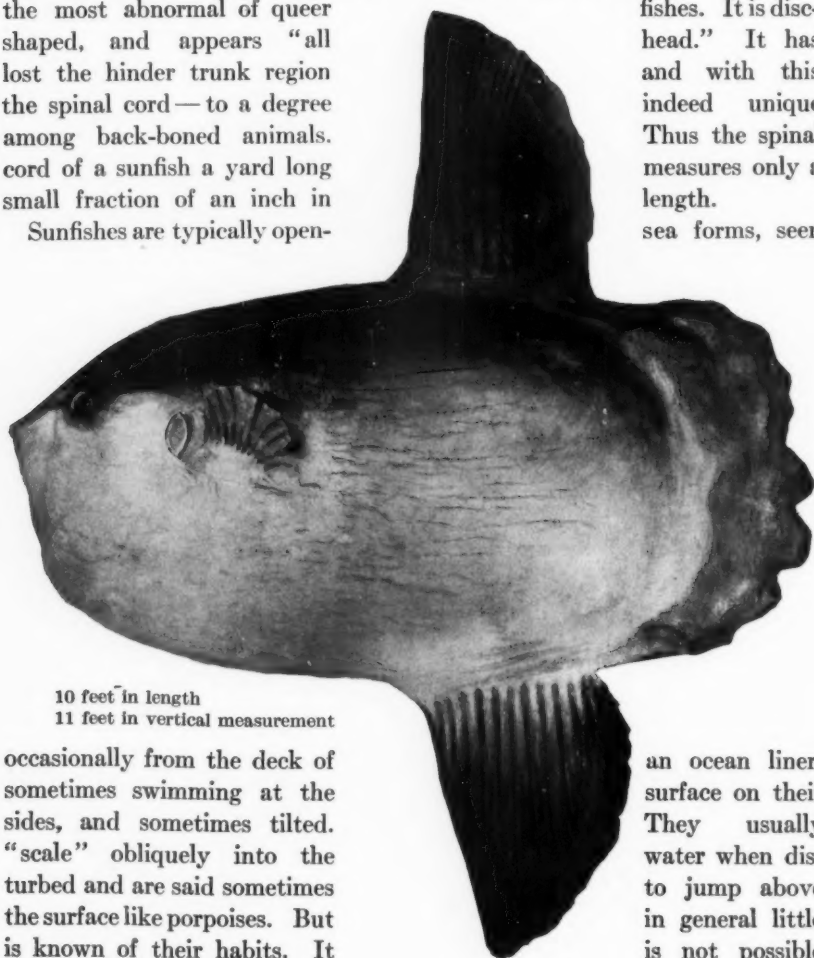
Totem poles in the village of Kitwingach in front of the house of a chief of the Kanhada clan

A RECORD SUNFISH

By Bashford Dean

THE Museum has recently acquired a mounted specimen of a monster sea sunfish, *Mola mola*, which was taken in 1910 off the coast of southern California. It appears that its captor, Mr. D. H. Buxton, "hooked it while angling." The sunfish has the reputation of being one of the most abnormal of queer shaped, and appears "all lost the hinder trunk region the spinal cord—to a degree among back-boned animals. cord of a sunfish a yard long small fraction of an inch in Sunfishes are typically open-

fishes. It is disc-head." It has and with this indeed unique Thus the spinal measures only a length. sea forms, seen



10 feet in length
11 feet in vertical measurement

occasionally from the deck of sometimes swimming at the sides, and sometimes tilted. "scale" obliquely into the turbid and are said sometimes the surface like porpoises. But is known of their habits. It to explain the "adaptations" is supposed to have undergone, and the steps in its evolution. Several of its earlier stages however, are known and they show how the tail region comes to be changed. Furthermore a clue as to the "cause" of its modifications was obtained by chance when the puzzle of the repro-

an ocean liner, surface on their They usually water when dis- to jump above in general little is not possible which this fish

duction of eels was studied; for it was discovered that young eels were often found in the stomachs of small sunfishes, and from what we now know of the natural history of eels, it seems clear that at one stage of its life the sunfish lives in deep water.¹ Its curious shape therefore may in some way be connected with its living under conditions of great pressure, where most fishes develop huge heads and spindling trunks.

Small specimens of sunfish are fairly common in the warmer seas. Large specimens however rarely come to the hands of the naturalist, so the present fish has a certain merit since it is apparently the largest of its kind to find its way to a museum. Dr. David Starr Jordan records that a specimen taken in 1893 near Los Angeles, weighed in life 1800 pounds, and measured eight feet two inches from snout to tail. The present specimen was ten feet, one inch in length when caught and nearly eleven feet in vertical measurement. The only record of a larger specimen known to the writer, was given in a popular magazine several years ago where a photograph was reproduced of a sunfish which had been killed by a steamer's propeller blade near the harbor of Sydney. This specimen, it is said, measured ten feet in length and was no less than fourteen feet in vertical measurement. Its weight was 4400 pounds.

There can be no question that the present specimen had attained great age, although its age cannot be estimated definitely. By analogy with other fishes it could hardly have been less than twenty years old and it may have been nearly a hundred. It shows an interesting old age character in the wrinkles which appear at many points, as shown in the photograph. These "wrinkles" are thin ridges formed originally from folds of skin whose sides had grown together — so completely in fact, that sections show that the ridge is solid, leaving the inner surface of the skin quite smooth. Thus the "wrinkles" are normal features, not due to defective taxidermy, as one at first suspects. Similar wrinkles appear in the photograph, which was taken of the fish as it was hoisted out of water. The tail of the present specimen had been badly injured, probably by attacks of sharks or of killer-whales, but its outline is to a large degree regenerated.

¹ Since this was written, a paper of Dr. Pellegrin (*Bull. Soc. Zool. de France*, vol. xxxvii, p. 228) has been received, which indicates that sunfishes collect and spawn (April) in definite areas (banks) in relatively deep water — as in the bay of Port-de-France. The eggs are minute.

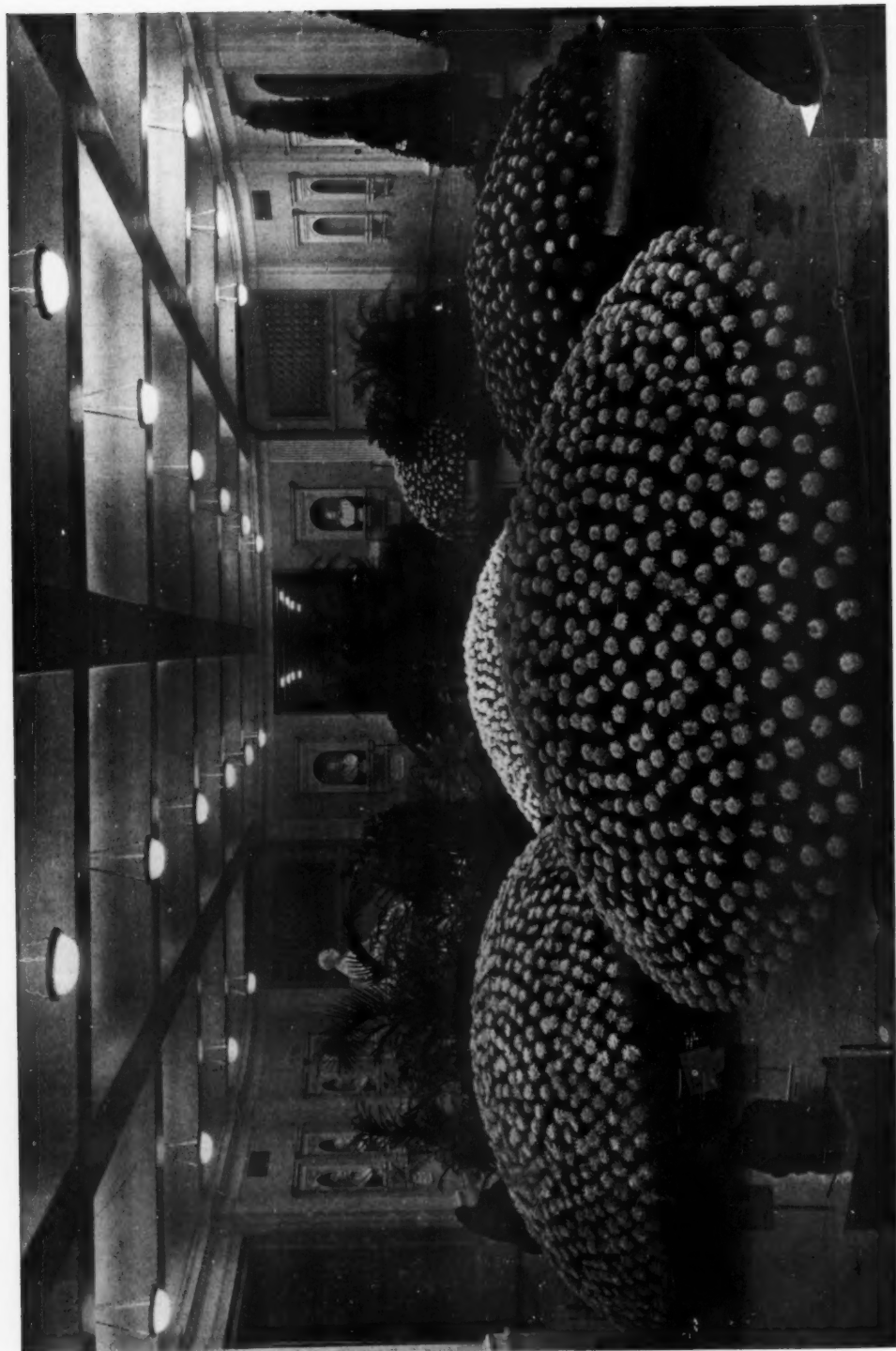


Photo by Walter L. Beasley

VIEW OF MEMORIAL HALL IN THE AMERICAN MUSEUM

This photograph taken during the exhibit of the Horticultural Society of New York and showing six of the bush chrysanthemums which attracted so much attention, is inserted especially to call attention to the soft and even effect given by the modern method of electric lighting recently installed

MUSEUM NOTES

SINCE the last issue of the JOURNAL the following persons have been elected to membership in the Museum:

Life Members, MESSRS. C. M. BERGSTRESSER, HENRY W. BOETTGER, ROBERT BOETTGER, LOUIS J. BONRY, JAMES C. BRADY, J. HOWARD FORD, A. V. de GOICOURIA, WILLIAM KENNON JEWETT, WILLIAM LATHROP RICH, THOMAS F. RYAN, BYRON L. SMITH, ALFRED G. VANDERBILT;

Sustaining Members, MESSRS. WILLIAM BRUCE-BROWN, DAVID LIEBMANN, EWALD H. SCHNIEWIND;

Annual Members, MRS. G. FALK, MRS. E. FREUND, MRS. EDWARD A. GROSSMANN, MRS. FREDERICK A. HALSEY, MRS. BLANCHE W. HULL, MRS. PERCY JACKSON, MRS. JOHN A. JOSEPH, JR., MRS. A. W. OPENHYM, MRS. WILLIAM A. PERRY, MRS. V. SYDNEY ROTHSCHILD, MRS. WILLIAM CUMMINGS SHANNON, the MISSES ALICE H. ANNAN, LILLIAN BENET, CAROLINE CHOATE, LUCY HUNT, M. E. LOWNDES, EMILY F. SPOONER, MAY STERNES, DR. OTTO SUSSMAN and MESSRS. JOHN DUNBAR ADAMS, WINTHROP W. ALDRICH, LEON SAMSON ALTMAYER, C. L. AUGER, THOMAS H. BARBER, IRA BARROWS, JOSEPH H. BENDIX, D. J. BENOLIEL, MAX BINSWANGER, THOMAS K. BOGGS, HENRY L. CAMMANN, EDWARD B. CAMP, WALTER F. CHAPPELL, H. C. CHATFIELD-TAYLOR, HUGH J. CHISHOLM, A. P. CLAPP, J. WILLIAM CLARK, ALBERT CLAYBURGH, A. DE WITT COCHRANE, AARON COLEMAN, FREDERIC M. CREHORE, WILLIAM H. DAVIDGE, J. M. DITTENHOEFER, GEORGE EHRET, JR., CHARLES EWING, WILLIAM J. FLESH, M. FRANKFORT, GEORGE C. FRASER, ROBERT A. GARDINER, LOUIS GOLDSMITH, I. EDWIN GOLDWASSER, FRED H. GREENEBAUM, ALFRED HARRIS, J. ARMORY HASKELL, H. C. HEIMERDINGER, JOHN LOCKMAN HELMUTH, HAROLD HERRICK, M. H. HIRSCHBERG, BERTHOLD S. HORKHEIMER, W. TRUSLOW HYDE, GUY B. JOHNSON, J. HENRY KAHRS, JOHN CLAPPERTON KERR, LEE KOHNS, JACOB J. LESSER, ARTHUR E. LONDERBACK, ANGUS S. MACDONALD, THOMAS S. McLANE, HERBERT R. MAINZER, SAMUEL MARCUS, FREDERICK MATHESUS, JR., H. F. NOYES, WILLIAM BARCLAY PARSONS, AARON S. PENNINGTON, WILLIAM D. N. PERINE, SETH LOW PIERREPONT, RUDOLPH RECHT, L. REICHENBACH, HENRY B. H. RIPLEY, WILLIAM M. SAVIN, HEWLETT SCUDDER, JR., R. D. SHIPMAN, MICHAEL M. SHOEMAKER, AUGUSTINE J. SMITH, FREDERIC O. SPEDDEN, J. CLINTON SPENCER, WILLIAM FREDERICK STAFFORD, SPENCER W. STEWART, FREDERIC J. STIMSON, JOHN R. STRONG, STERRETT TATE, ROBERT THORNE, H. W. VAN WAGENEN, E. ROBBINS WALKER.

THE electric lighting of large buildings has progressed so rapidly that what seemed admirable a decade ago is now hopelessly behind the times. In this respect the Museum has fared badly; not only is the power insufficient to operate all the old incandescent lights at once, but even at the best they contrast but poorly with the modern tungsten lights. The view of memorial hall taken during the recent exhibit of the Horticultural Society of New York, shows well the vast improvement of the present lights over the old-time clusters. The light though brilliant is soft, and while every part of the hall is illuminated and shadows are obliterated, the eye of the observer is not strained. This shows what might be accomplished throughout the building were funds available for the replacement of the old lamps by new, since the present engine power is sufficient for a complete installation of tungsten lamps. The small lecture halls, the hall containing the exhibit of the department of public health and that containing the collection of local birds have been equipped with new fixtures and tungsten lamps, and these give more than a hint of the improvement that might be effected in other halls.

DR. CARLOS DE LA TORRE of the University of Havana, Cuba, has made a very interesting and valuable addition to the collection of conchology in the department of invertebrate zoology. This material was secured by Dr. F. E. Lutz in his recent visit to Cuba and consists of land shells, many of which are described by Dr. La Torre. The genus *Urocoptis* forms the larger number of these and the cotypes which accompany them add immensely to their immediate interest. There are many specimens of the round-mouthed shells, a number of *Helicidae* and some very interesting and striking examples of *Cerion*. The gift embraces 139 species and 655 specimens.

A SERIES of three lectures has been planned for the classes of blind children that visit the Museum. In the first of these on December 18, Admiral Robert E. Peary will recount some of the experiences of his memorable Arctic journey which resulted in the attainment of the North Pole.

On December 31, Professor Henry Fairfield Osborn will read a paper on "Final Results of the Phylogeny in the Titanotheres" before the American Society of Palaeontologists.

A SERIES of three lectures has been planned for the classes of blind children that visit the Museum. In the first of these on December 18, Admiral Robert E. Peary will recount some of the experiences of his memorable Arctic journey which resulted in the attainment of the North Pole.

On December 31, Professor Henry Fairfield Osborn will read a paper on "Final Results of the Phylogeny in the Titanotheres" before the American Society of Palaeontologists.

A PANEL recently completed in the tertiary mammal hall of the American Museum shows the geographical distribution of rhinoceroses, past and present. These animals now surviving only in the Oriental and Ethiopian regions were abundant in the Tertiary over all the northern continents. Skulls of the principal types, existing and extinct, are arranged in the four sections of the panel representing North America, Asia, Europe and Africa. Their evolutionary history in this continent from their first appearance in the Eocene to their extinction in the Pliocene is also set forth.

THE American Anthropological Association and the American Folk-Lore Society will hold their annual meetings at the Museum, December 29-31.

THE thirty-first stated meeting of the American Ornithologists' Union, held at the Museum from November 11 to 14, was one of the most largely attended in the history of the association. The one hundred and twenty members who registered represented twelve states, and several Canadian members were also present. Illustrated papers of especial interest were those on "Birds of the Bogotá Region of Colombia" by Dr. F. M. Chapman; "Crossing the Andes of Peru," by Dr. Wilfred H. Osgood; and "Birds of the South Atlantic," by Mr. Robert C. Murphy. By the courtesy of Mr. Robert W. Priest of the Gaumont Company there was a special exhibition of the Scott motion pictures showing the animal life of the Antarctic. The next meeting will be held in Washington, D. C., during April, 1914.

DR. W. D. MATTHEW has been invited to contribute to the series of Silliman Lectures at Yale University, commemorative this year of the centenary of the birth of James Dwight Dana. His subject will be the "Tertiary Sedimentary Record and its Problems," the dates of the lectures, December 18 and 19.

A NEW group in the reptile series that is being constructed under the supervision of Miss M. C. Dickerson, will be opened to the public at about Christmas time. The new group pictures a rocky island with desert plants and hot sunshine, off the



Photo by Frederick H. Smyth

VISITORS WAITING IN LINE FOR ENTRANCE TO THE MUSEUM

During the four days of the continuance of the fall exhibit of the Horticultural Society of New York, 170,000 people visited the Museum

coast of Lower California and shows the lizards of the locality, the chuckawallas, iguanas and other smaller species. The reptiles of the group were collected by Dr. Charles H. Townsend on the "Albatross" expedition of 1911, which was made possible through the courtesy of the Department of Commerce and Labor at Washington and the generosity of Mr. Arthur Curtiss James.

DR. CLARK WISSLER has been elected vice-president of the Section of Anthropology and Psychology of the New York Academy of Sciences and Dr. Robert H. Lowie has been reelected secretary of the Section.

IN the alcove of the North American archaeology hall of the Museum a mural series of unusual interest has recently been completed. It consists of five polychrome frescoes, three of which are enlarged copies of the frescoes on the walls of the cavern of Font-de-Gaume in France and two are enlarged copies from the ceiling of Altamir in Spain, the latter having been reproduced in color in this magazine for December, 1912. The originals of these are handed down to us from the Old Stone Age and represent paleolithic art at its highest point of perfection. The date of these cavern paintings is problematical but it is safe to say that they were painted at least twenty-five thousand years ago. The copies in the Museum were made by Mr. Albert Operti.

DR. C. V. HARTMAN, curator of ethnology of the Naturhistoriska Riksmuseum of Stockholm, who is well known to American investigators for his researches in Costa Rica, recently spent several days at the Museum.

THE MUSEUM has taken this year a step in the direction of practical public service by including in its members' courses a series of lectures on the "Principles of Healthy Living," which have been greatly appreciated by the teachers in the public schools and by those interested in public-health work.

The first lecture on November 12 was by Walter B. James, trustee of the Museum and professor of clinical medicine at the College of Physicians and Surgeons, on the "Body and its Surroundings"; the second lecture, November 19, was by H. C. Sherman, professor of food chemistry at Columbia University, on "Food"; the third, November 26, by T. A. Storey, professor of hygiene at the College of the City of New York, on "Exercise and Rest"; the fourth, December 3, is to be by Frederic S. Lee, professor of physiology at Columbia University, on "Fresh Air"; and the fifth, December 10, will be given by C.-E. A. Winslow, curator of public health at the American Museum, on "Control of Germ Diseases in the Household." The lectures are to be printed in book form by G. P. Putnam's Sons.

AN eight or nine foot specimen of the peculiar nurse shark, *Ginglymostoma cirratum*, from Florida has recently been received at the Museum, having been brought alive to the New York Aquarium. Plaster molds of it have been made and a cast will be placed on exhibition.

THE department of anthropology has recently purchased from Mr. G. A. Paul of Oldtown, Maine, a collection from the Micmac Indians. The Museum has hitherto possessed very few specimens from this tribe and such specimens are rare in most institutions. The collection includes some old specimens of beadwork and various utensils showing carving similar to the characteristic work of the northeastern New England tribes.

DURING the latter part of December and throughout the coming January, there will be a special exhibit of photographs of the Indians of the Southwest, by Mr. Frederick Monsen, well-known for his artistic work. The pictures will be hung in the west assembly room and in the aisle of the hall of the Woodlands Indians

Scientific Staff

DIRECTOR

FREDERIC A. LUCAS, Sc.D.

GEOLOGY AND INVERTEBRATE PALÆONTOLOGY

EDMUND OTIS HOVEY, Ph.D., Curator

CHESTER A. REEDS, Ph.D., Assistant Curator

MINERALOGY

L. P. GRATACAP, A.M., Curator

GEORGE F. KUNZ, Ph.D., Honorary Curator of Gems

INVERTEBRATE ZOÖLOGY

HENRY E. CRAMPTON, Ph.D., Curator

ROY W. MINER, A.B., Assistant Curator

FRANK E. LUTZ, Ph.D., Assistant Curator

L. P. GRATACAP, A.M., Curator of Mollusca

JOHN A. GROSSBECK, Assistant

A. J. MUTCHLER, Assistant

WILLIAM MORTON WHEELER, Ph.D., Honorary Curator of Social Insects

AARON L. TREADWELL, Ph.D., Honorary Curator of Annulata

CHARLES W. LENG, B.S., Honorary Curator of Coleoptera

ICHTHYOLOGY AND HERPETOLOGY

BASHFORD DEAN, Ph.D., Curator Emeritus

LOUIS HUSSAKOF, Ph.D., Associate Curator of Fishes

JOHN T. NICHOLS, A.B., Assistant Curator of Recent Fishes

MARY CYNTHIA DICKERSON, B.S., Associate Curator of Herpetology

MAMMALOGY AND ORNITHOLOGY

J. A. ALLEN, Ph.D., Curator

FRANK M. CHAPMAN, Sc.D., Curator of Ornithology

ROY C. ANDREWS, A.M., Assistant Curator of Mammalogy

W. DEW. MILLER, Assistant Curator of Ornithology

VERTEBRATE PALÆONTOLOGY

HENRY FAIRFIELD OSBORN, Sc.D., LL.D., D.Sc., Curator Emeritus

W. D. MATTHEW, Ph.D., Curator

WALTER GRANGER, Associate Curator of Fossil Mammals

BARNUM BROWN, A.B., Associate Curator of Fossil Reptiles

WILLIAM K. GREGORY, Ph.D., Assistant Curator

ANTHROPOLOGY

CLARK WISSLER, Ph.D., Curator

PLINY E. GODDARD, Ph.D., Associate Curator

ROBERT H. LOWIE, Ph.D., Associate Curator

HERBERT J. SPINDEN, Ph.D., Assistant Curator

NELS C. NELSON, M.L., Assistant Curator

CHARLES W. MEAD, Assistant Curator

ALANSON SKINNER, Assistant Curator

HARLAN I. SMITH, Honorary Curator of Archæology

ANATOMY AND PHYSIOLOGY

RALPH W. TOWER, Ph.D., Curator

PUBLIC HEALTH

CHARLES-EDWARD AMORY WINSLOW, M.S., Curator

ISRAEL J. KLIGLER, B.S., Assistant

WOODS AND FORESTRY

MARY CYNTHIA DICKERSON, B.S., Curator

BOOKS AND PUBLICATIONS

RALPH W. TOWER, Ph.D., Curator

IDA RICHARDSON HOOD, A.B., Assistant Librarian

PUBLIC EDUCATION

ALBERT S. BICKMORE, Ph.D., LL.D., Curator Emeritus

GEORGE H. SHERWOOD, A.M., Curator

G. CLYDE FISHER, Ph.D., Assistant Curator

AGNES LAIDLAW VAUGHAN, Assistant

THE AMERICAN MUSEUM
OF
NATURAL HISTORY

FOR THE PEOPLE
FOR EDUCATION
FOR SCIENCE

